MARINE REVIEW.

VOL. XVII. CLEVELAND, O., MAY 5, 1898. No. 18.

Battleships, Monitors and Torpedo Boats.

Naval enthusiasts will have no cause for complaint on account of the action of the present congress regarding new vessels. All of the senate amendments to the annual naval appropriation bill as regards new ships have been accepted, including the provision for four coast defense monitors, which will be especially pleasing to the advocates of the type of armored vessel invented by Ericsson. The bill provides in all for three high-powered first-class battleships; four monitors of the Terror type; sixteen torpedo boat destroyers of at least 30 knots speed; twelve torpedo boats of from 25 to 30 knots, and one gunboat for the great lakes. By special provision of the bill, advertisements calling for bids for construction of the torpedo boats and destroyers will run only three weeks instead of three months, as is usual. The department will describe only the general characteristics of the torpedo boats, leaving to the bidders the submission of plans for their construction. When the department has placed contracts for the vessels authorized by this bill, the government will have under construction at one time a greater number of vessels than it has had building since the war, and a greater tonnage in the aggregate than at any time during the civil conflict. There will be no less than thirty-six vessels altogether thus placed under construction, in addition to those already under way in the ship yards.

JOHN ERICSSON,
INVENTOR OF THE MONITOR.

Cargo Records—Lake Freight Ships.

The largest cargo of any kind—grain, coal or ore—ever moved on the lakes was that of the Wilson line steamer Andrew Carnegie—230,000 bushels of corn, equal to 6,440 net tons—which was delivered at Owen Sound, Ont., a few days ago, from Chicago. The Carnegie was loaded well up to her limit, as there was plenty of water at both ports. The ore cargo of the new Chicago steamer W. R. Linn, taken from Escanaba to South Chicago on Monday last, does not represent the full capacity of that vessel, although it establishes a new record in ore. This load, allowing 1 per cent. over Escanaba weights for moisture, aggregated 5,638 tons gross, or 6,314 tons net, which is only seven net tons more ore than has been moved in a single cargo from Lake Superior by the steel barge Amazon of the Corrigan fleet. A new record in wheat cargoes is also established. Another of the Corrigan barges, the Australia, has just delivered at Buffalo from Chicago, 210,539 bushels of wheat, equal to 6,316 net tons. Part of this cargo was loaded far up the Chicago river and the balance taken on at lower elevators. Cargo records to date are as follows:

Iron ore—Steamer W. R. Linn, owned by C. W. Elphicke and others of Chicago, 5,638 tons gross, or 6,314 net, Escanaba to South Chicago; schooner Amazon, James Corrigan of Cleveland, 5,631 tons gross, or 6,307 net, Duluth to South Chicago, draft of 17 feet 1 inch; steamer Empire City, A. B. Wolvin of Duluth, 5,622 tons gross, or 6,296 net, Two Harbors to Cleveland, draft of 17 feet 2 inches.

Grain—Steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 230,000 bushels of corn, equal to 6,440 net tons, South Chicago to Owen Sound; steel schooner Australia, James Corrigan of Cleveland, 210,539 bushels of wheat, equal to 6,316 net tons, Chicago to Buffalo; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 332,100 bushels of oats, equal to 5,313 net tons, Manitowoc to Buffalo.

Coal—Schooner Polynesia, James Corrigan of Cleveland, 5,654 net tons of bituminous, Cleveland to Duluth, 16 feet draft; steamer Carnegie, Wilson Transit Co. of Cleveland, 5,369 net tons of bituminous, Cleveland to Duluth.

The Delay of Ore Shipments.

It is certainly fortunate for vessel owners that the movement of grain out of Chicago has been heavier than in any previous spring in the history of lake trade. If it were not for this enormous movement of grain, the early opening of navigation would have been a great drawback to the vessel interests. Steam shovel mines in the Lake Superior region are only now beginning shipments, and in many cases steam shovels have only recently been put to work on stock piles on account of the frost which they contained. The movement of ore from Lake Erie docks up to this time has also been very slow, largely on account of the desire of furnace managers to take advantage of lower rail freights, which have just gone into effect. With the opening of the coming week it is expected these conditions will be changed, and improvement is looked for also in shipments of coal.

Mr. H. M. Hanna, president of the Globe Iron Works Co., has sold his steel steam yacht Comanche to the government. The vessel was examined twice within the past ten days by naval officers and finally sold on Monday last. It has been said that the Globe company will build another yacht, presumably for Mr. Hanna. This report is probably not well founded, but the company has another contract. They will build a sea-going tug for the New Orleans owners of the Wilmot, built at West Bay City and recently sold to the government.

Deep Waterways Appropriation.

Washington, D. C., May 3.—A senate amendment to the clause in the sundry civil appropriation bill which provides $225,000 for surveys of deep water routes from the great lakes to the Atlantic seaboard, has caused considerable comment among congressmen from lake states who are interested in these surveys and investigations. The amendment, if adopted finally in the bill, will necessitate a change in the plans of the board of engineers known as the Deep Waterways Commission, and of which Major Raymond of the army engineer corps (Philadelphia), Geo. Y. Wisner of Detroit and Alfred Noble of Chicago are members. A representative from one of the lake cities who is fully informed regarding the work of the commission says:

"It will not be possible for these engineers to outline a programme of future operations until they know the conditions surrounding the appropriation after action of the conference committee of congress. The amendment added in the senate is as follows: 'And said board shall make a full and detailed report of their proceedings to the secretary of war for transmission by him to congress at the commencement of its next session, and submit in said final report the probable and relative cost of various depths for said waterways respectively as follows: 12, 18, 21, 26 and 30 feet, with a statement of the relative advantages thereof.' This amendment requires a final report next fall, which is practically an impossibility. You will also note that it calls for a report on a 12-foot barge canal, which would indicate that possibly the bill may contemplate an investigation of the Erie canal barge project advocated by Major Symons. The plans of the commission as now arranged contemplate the completion of field work on all the ship-canal surveys this season, viz.: the Niagara ship-canal, the Oswego-Mohawk route, and the St. Lawrence-Champlain route. It will then take several months to reduce these field notes, develop routes, devise plans and estimate the cost of same. It is safe to say that a final report cannot be made to congress at its next session, but the engineers expect to be able to report at that time that field work of surveys has been completed and submit a report and plan for regulation of the lake levels. They also expect to report on the Niagara ship-canal.

"The present status of work is as follows: Niagara ship-canal surveys, completed but not reduced; discharge observations for Niagara river, completed and reduction nearly completed; Oswego-Mohawk route, to be completed about Nov. 1, and if appropriation bill becomes a law soon, the St. Lawrence-Champlain route to be completed also about Dec. 1. The engineers do not feel justified in putting additional parties at work on the Champlain route until they know definitely in what shape the appropriation will finally pass. There are two parties at work on the Oswego-Mohawk route, and surveyors are working north from Troy on the Champlain route, and another party will be put on the northern division of this route as soon as the bill passes and necessary authority is obtained. In addition to the above it is expected to have investigations made of the foot of Lake Erie for a site for the proposed regulating dam; also of Olcott and Oswego harbors and of the St. Lawrence and lower Hudson rivers, where there is less than the required depth."

How the Servia Was Burned.

The protest made in Cleveland after the crew of the burned steamer Servia arrived down from the Sault tells the full story of the accident. One of the watchmen aboard the vessel, a young man from Milwaukee, had knowledge of the cause of the fire, but kept the secret from the captain until the testimony had all been taken. He was painting on deck when told by the mate before supper to go below and put the paint away in a place that had been formerly used as a lamp room, and where there was a rack in which the paint pots might be deposited. The watchman was unused to the place, and after descending the stairs put down the paint pot, and with a piece of lighted candle sought the rack. On returning for the paint he slipped and fell, with the candle in hand. The light was thrust into a pile of loose oakum, which was fired immediately, and in an instant the whole lower part of the vessel forward was filled with flame and smoke. The watchman had barely time to get out alive. He told the other men of the crew what had happened, and they advised him to keep the matter quiet, thinking it might have some bearing on the insurance. But after the testimony was over with in Cleveland, he concluded to give up his secret to the captain and owners, and, of course, the protest and other legal papers pertaining to the accident were changed accordingly.

The story of the efforts of Capt. Fred. Ahlstrom and his crew, assisted by men from the Alberta, to put out the fire, is substantially as told in the dispatches from Sault Ste. Marie. The crew of the Servia worked on the fire for two hours before the Alberta came to their assistance. Then with the aid of some twenty-five men from the Alberta, and her three lines of hose, their efforts were continued for about two hours longer before the ship was finally abandoned.

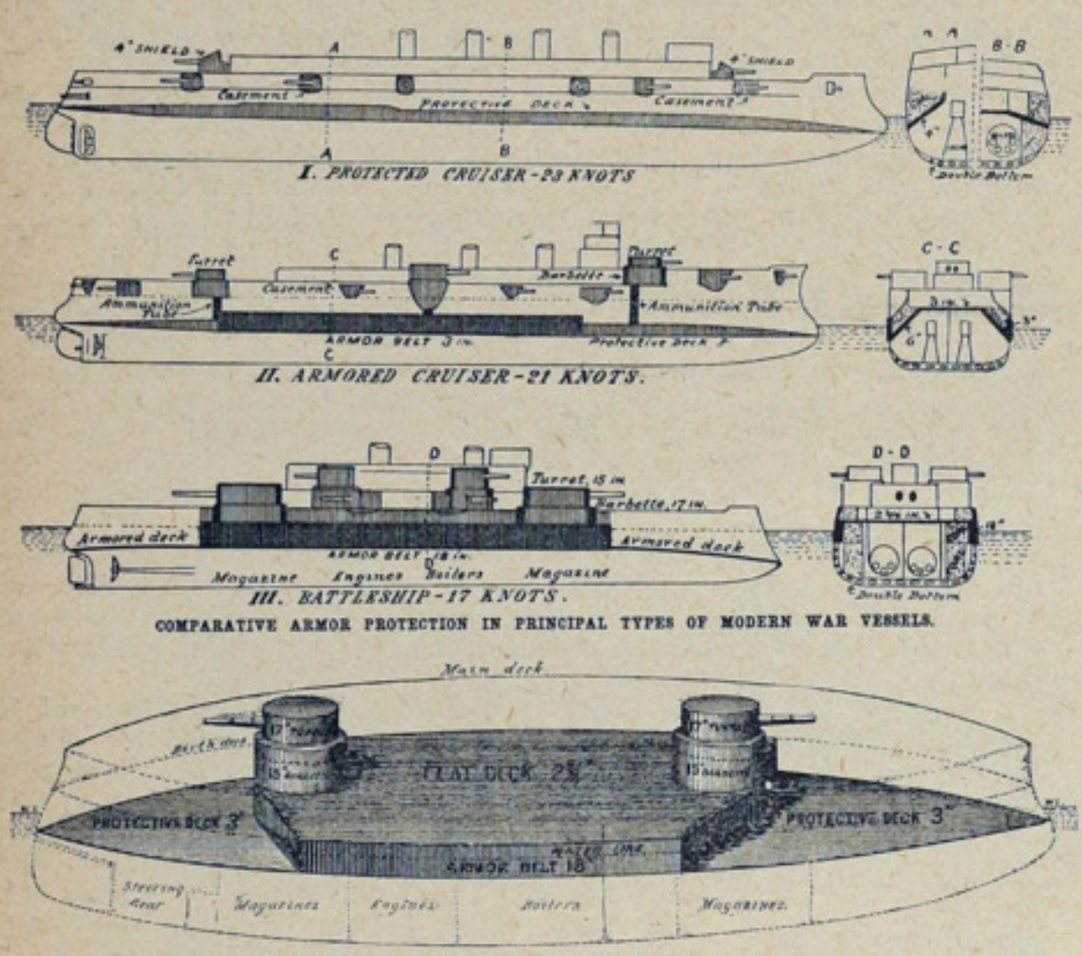
Real estate and mining property appear on a balance sheet accompanying the annual report of the Lake Superior Iron Co. at $1,246,455.61 and the company's six steamers at $610,000. The report is for the year ending Dec. 31, 1897, and shows for that year net profits aggregating $66,498.16, after crediting depreciation account with $30,000, which was the amount charged off as reduction in valuation of the company's vessels. The company's capital stock is $2,500,000, of which $400,000 is treasury stock, so that the net profits are 3 per cent. of the investment thus indicated. Two dividends of $1 per share each were paid during the year.

TYPES OF MODERN WARSHIPS.

CONSTRUCTIVE FEATURES OF THE BATTLESHIP, ARMORED CRUISER, PROTECTED CRUISER AND MONITOR—QUALITIES MARKING THE DISTINCTION BETWEEN THEM.

The modern warship is just now a very popular subject, and the familiarity of the public with the technical phrases of naval architecture is surprising, but it is a question whether the average reader has a very accurate idea of the distinctions between various classes of ships and between the various elements from the combination of which these ships derive their distinctive class characteristics. He is told that the Indiana is a battleship, the Brooklyn an armored cruiser, the Columbia a protected cruiser and the Puritan a monitor. But it is probable that he has only a vague idea as to the qualities that mark the distinction. These questions are answered in a carefully prepared article, which has just appeared in a special naval issue of the Scientific American Supplement, and from which the diagrams appearing herewith were reproduced. The three diagrams and a perspective drawing show the constructive features of the several types of warships referred to above.

In diagrams 1 to 3 armor is indicated by full black lines or by shading, the approximate thickness of the armor being shown by the thickness of the lines and the depth of the shading. The fine lines represent the



COMPARATIVE ARMOR PROTECTION IN PRINCIPAL TYPES OF MODERN WAR VESSELS.

(All parts above the water line, shown by dotted lines and light sections, might be shot away without destroying the fighting power of the ship.)

THE INVULNERABLE FLOATING FORT WITHIN THE OUTER WALLS OF A MODERN BATTLESHIP.

unarmored portions or the ordinary plating of the ships. In the perspective view the armor is shown by full lines and shading and the ordinary ship plating by dotted lines. When the naval architect sits down at his desk to design a warship of a certain size, he knows that there is one element of the vessel which is fixed and unalterable, and that is her displacement. By displacement is meant the actual weight of the ship, which is, of course, exactly equal to the weight of the water which she displaces. This total weight is the capital with which the architect has to work, and he uses his judgment in distributing it among the various elements which go to make up the ship. Part is allotted to the hull, part to the motive power, part to the armor protection, part to the guns and part to the fuel, stores, furnishing and general equipment.

It is evident that the allotment of weights is a matter of compromise—whatever excess is given to one element must be taken from another; else the ship will exceed the given displacement. Among elements above mentioned there are some, such as weight of hull, provisions, stores and furnishing, which for a given size of ship will not vary greatly. There are other elements, such as guns, armor, engines and fuel supply, which may vary considerably in different ships, according to the type of vessel that is produced. If, for instance, the architect is designing an extremely fast ship of type No. 1, which has a speed of 23 knots, he will have to allot such a large amount of weight to the motive power that he will only be able to give the ship very slight armor protection and a comparatively light battery of guns. If he wishes to produce a fast ship that shall be more heavily armed and armored, he has to be content with less speed, say 20 or 21 knots, as in No. 2, and the weight so saved on the motive power appears in the shape of a side belt of armor at the water line, more complete protection for the guns in the shape of barbettes and turrets and considerably heavier armament. If, again, he desires to produce a ship capable of contending with the most powerful ships in line of battle, as in No. 3, he is content with much lower speed, say 16 or 17 knots an hour, and he increases the power of his guns until they weigh over sixty tons apiece, and protects them with great redoubts and turrets of steel 1½ feet thick, besides protecting his water line in the region of the engines and boilers with a belt of steel of the same dimensions.

The swift and lightly armed and armored ship is known as a protected cruiser; the less speedy but more heavily armed and armored ship belongs to the armored cruiser type, and the slowest ship, with its capacity for taking and giving the heaviest blows that modern guns can inflict, is known as a battleship.

In the construction of a warship the two qualities of attack and defense have to be supplied. The offensive powers are furnished by the guns, the torpedoes and the ram; the defensive powers are provided by giving the ship a complete double bottom and an abundance of watertight compartments, and by providing it with as much armor plating as it will carry to keep out the shells of the enemy. The greatest danger to which a warship is exposed is that of being sunk either by underwater attack by torpedoes or the ram, or by being penetrated at the water line by heavy shell-fire. The destructive force of a torpedo is so great that all that can be done is to localize its effects. For this purpose, and also to give greater structural strength, the hull below the water line is built double—a hull within a hull. The longitudinal and transverse plate framing of the ship is built in between these shells, which are known as the inner and outer bottoms, and the space is thus divided into innumerable watertight compartments or cells. There is a possibility that a blow that would burst in the outer shell might not rupture the inner shell; but if it should, the inflow of water is confined to a limited portion of the hull by dividing the latter by transverse and longitudinal walls or bulkheads of plating. A blow that burst in both outer and inner shells would only admit water to one of many compartments, and the ship would still have a large reserve of buoyancy.

In protecting warships against shell-fire it is recognized that there are certain parts of the ship which are of paramount importance, inasmuch as their disablement would leave it at the mercy of the enemy. These are the "vitals" of the ship, and they comprise the magazines, the boilers, the engines and the steering gear. If a shell penetrated the magazines, it would be liable to result in the blowing up of the whole ship, and if it entered the boiler, engine or steering rooms, it would probably render the ship unmanageable, in which event she would run the risk of being rammed and sunk by the enemy. In all warships the vitals are covered by a complete protective deck of steel, which varies in thickness from 1½ to 3 inches. The highest part of the deck is generally at a slightly higher level than the water line amidships, and it curves down at each end to meet the bow and the stern. In the battleships this deck is generally flat from side to side amidships for about two-thirds of the ship's length. At the sides it rests upon a wall of vertical armor from 15 to 18 inches in thickness, which extends in the wake of the magazines, engines and boilers. This side armor is usually about 7½ feet in height, 3 feet of it being above and 4½ feet below the water line. At each end of the side armor a transverse wall of armor extends clear across the ship. This rectangular wall with its roof of 3-inch steel thus forms a kind of inverted box, snugly sheltered below which are the before mentioned "vitals" of the ship. At each end of this inverted box two huge barbettes, with walls 15 to 17 inches thick, are built up to a few feet above the main deck, and just within and above them revolve a pair of turrets with walls of 15 to 17-inch steel. (See perspective view). The turrets give shelter to the big guns, of which there are a pair in each, and the barbettes protect the turning gear by which the turrets are rotated. There is thus a continuous wall of 15 to 17-inch steel extending from 4 feet below the water line to the roofs of the turrets.

With this description in mind the reader will see, on looking at diagram No. 3, that before heavy shells can injure the engines, boilers or guns, they must pass through from 15 to 18 inches of solid, and, in the case of American battleships, face-hardened Harvey steel. The 6-inch and 8-inch guns are protected by 6 and 8 inches of steel. Now it can readily be understood that all this amount of heavy armor and guns adds greatly to the weight of the ship, and for this reason, in spite of her smaller engine power, a first-class battleship rarely displaces less than 10,000 tons, and in some foreign navies the displacement runs up to nearly 16,000 tons. This will be understood by reference to the perspective view, where the armored portions of the ship are indicated by full lines and shading, the ordinary shell plating being dotted. It will be seen that all that part of the ship lying below the water line is shut in by a continuous roof of steel which is 3 inches in thickness forward and aft of the bulkheads. Over the central armored citadel it is 2¾ inches thick. All the plating indicated by dotted lines might be shot away without the "vitals" suffering injury or the ship being sunk. The reader will see that it is its loftier sides and the extra deck and freeboard which they provide which constitute practically the difference between a battleship and a monitor.

This brings us to the consideration of the monitor type. Take away from a battleship all that portion which is shown in our drawing in dotted lines above the water line; lower the barbettes until they rise only a few feet above the steel deck, and we have a ship of the general monitor type. The monitor is distinguished by very low freeboard—only a few inches in the extreme type—the absence of a heavy secondary battery and the possession of a main armament of heavy guns. Such a ship labors heavily in bad weather and is not intended for service at any distance from the coasts. To make a seagoing vessel out of her it would be necessary to add one, or even two decks, placing the guns well up above the water, after which changes she would be no longer monitor, but seagoing battleship.

In the cruiser type the protective deck does not extend across the ship at one level, but curves down to meet the hull at a point several feet below the water line. This sloping portion is made thicker than the flat portion, as in diagram No. 2, where the deck is 3 inches thick on the flat and 6 inches on the slopes. In the case of the armored cruisers, a belt of vertical armor is carried at the water line and in all cruisers the V-shaped space between belt and sloping deck is filled in with coal or with some form of water-excluding material, such as cornpith cellulose. In diagram 2, which represents the fine armored cruiser Brooklyn, it will be seen that before it could reach the engine room a shell would have to pass through 3 inches of vertical steel, about 6 feet of coal and 6 inches of inclined armor—a total resistance equal to 14 or 15 inches of solid steel. The guns and turning gear are protected by 5½-inch steel turrets and 8-inch barbettes. The barbettes, it will be seen, do not extend continuously down to the armored deck, as in the battleship, for this would require a greater weight of armor than can be allowed. Consequently, the architect is only able to furnish the guns with a small armor-plated tube for protecting the ammunition in its passage from the magazines to the barbettes. In the protected cruiser the side armor at the water line disappears altogether, and dependence is placed entirely upon the sloping sides of the protective deck, the water-excluding cellulose and the 6 or 8 feet of coal which is stowed in the bunkers in the wake of the engines and boilers. The barbettes, turrets and armored ammunition tubes of the

armored cruiser disappear, and their place is taken by comparatively light shields and casements of 4-inch steel which serve to protect the gun crews.

It will be seen from the above description that each class of vessel is only fitted to engage ships of its own type. The protected cruiser Columbia (No. 1) might, with her light 6 and 4-inch guns, hammer away all day at the Indiana (No. 3) without being able to do much more than knock the paint off the latter's 18-inch armor, whereas one well-directed shot from the 13-inch guns of the Indiana would be sufficient to sink or disable the Columbia. The Brooklyn would fare better, and at close range her 8-inch guns might happen to penetrate the belt or turret armor of the Indiana, but the issue of the duel would never be in doubt for an instant. A Columbia or a Brooklyn would show its heels to an Indiana or Massachusetts, and their great speed would give them the option of refusing or accepting battle with almost any craft that is afloat upon the seas today. It should be mentioned, in conclusion, that the dividing lines in the classification of warships are somewhat flexible. We may find a battleship like the 12,320-ton Yashima (Japanese), with a trial speed of 19½ knots. On the other hand, we see cruisers like the Viscaya (Spanish), with a 12-inch belt and carrying heavy guns of 11-inch caliber.

Weather on the Lakes in May.

On an average six storms pass over the lake region in May, the majority of which, however, can be safely weathered by the larger craft. The number of storms in May during the last twenty years has neither increased nor diminished. There were more storms in 1892 than in any other year, yet the loss to marine interests was not so great as in the years 1894 and 1895. During the ten years, 1877 to 1887, the money value of vessels lost or damaged in May amounted to about half a million dollars; from 1887 to 1896, both inclusive, the loss amounted to a little over a million and a half, although fewer vessels were lost or damaged during the last-named period. By far the greater number of storms that pass over the lake region during this month come from the northwest. The storms of May, and also of the summer months, are not so severe as those of late fall and winter. Neither are the outward signs of their approach precisely the same. The dangerous winds of summer are the squall winds which accompany thunderstorms. They last but a short time, and their coming can almost always be foretold by the appearance of the western sky. The barometer is unsteady, rising and falling quite abruptly. The day is generally close and oppressive and the clouds present a broken and heaped-up appearance.

Probably the most disastrous May storm that has occurred in the lake region during the last twenty-five years crossed the southern end of Lake Michigan on May 18, 1894. The day previous had been warm and sultry and numerous thunderstorms occurred throughout Wisconsin, Illinois, Michigan, Ohio and Indiana. On the morning of the 18th the winds were north-northeasterly and exceedingly gusty, the velocity varying from 30 miles per hour one minute to 60 the next. The sea likewise was unusually heavy, the waves being short and choppy, measuring from 10 to 15 feet from hollow to crest. To add to the danger of wind and sea, rain mixed with snow fell during the afternoon hours. As a result of the storm twenty-six lives were lost, fourteen vessels were totally and twelve others partially wrecked, involving a money loss of over $80,000. —United States weather bureau chart.

Is the Ship on an Even Keel?

While inspecting the engines, etc., of the S. S. Campania recently, I noticed the ship had a considerable list to the port side, and it occurred to me there and then to ask the engineer, who was showing me around, if there was any mechanism by which he could tell whether the ship was on an even keel or not without going out of the engine room. He thereupon piloted me to the bulkhead which separates the port from the starboard engine room (the ship has twin screws), and when we reached the door by which entrance is gained from one room to the other, he pointed to a cord suspended on the exact edge of the plates and as near as could be judged in the middle of the steamer (I mean sideways, of course). The manner in which this cord was suspended was as follows: The door, which was nearly always open, was probably 3 inches thick and was made to slide vertically in a corresponding slot in the bulkhead. Near the top of this doorway a small piece of wood about an inch square was wedged and from it was suspended a cord, on the end of which cord was tied a three-quarter-inch nut. Almost on the engine room floor another piece of wood, similar to the upper one, was wedged, and on it chalk had been rubbed and the exact center scribed with a pencil. Of course, when the ship was on an even keel the cord would be hanging plumb with the pencil mark on the lower piece of wood, and it occurred to me at the time as being another example of the truth that often our most useful servants are lying around us and we pass them by, seeking for some new thing perhaps not half so valuable. This rig could easily be pulled down when necessary and yet it accomplished the purpose intended. The engineer, in filling water tanks, etc., knew at a glance where he stood.

JAS. J. SALMOND.

Port Richmond, N. Y., April 30, 1898.

Among recent orders for naphtha launches booked by the Gas Engine & Power Co. and Seabury & Co., Consolidated, of New York, are the following: A 62-foot twin-screw vessel, fitted with two 12-horse power engines for L. D. Fiske, Hartford, Conn.; 30-foot, 6-horse power for the Lake Drummond Canal & Water Co., Baltimore, Md.; 25-foot, 4-horse power for B. J. Worman, for use on the St. Lawrence river; 33-foot, 10-horse power for Rev. Alex. M. Smith, Washington, D. C.; and a 30-foot, 6-horse power for Dr. W. F. Mittendorf of New York.

See the soldiers in camp at Columbus, Ohio.—Special excursion rates via the Nickel Plate road to Columbus, Ohio, Sunday, May 8. Good going on train No. 3, leaving Cleveland at 5:06 a. m. Returning, leave Columbus at 6 p. m. Fare, $1.50. 41

Low Prices on Harbor Work.

J. B. Donnelly of Buffalo, who will build the stone foundation for the extension of the east arm of the Cleveland breakwater, has agreed to furnish in place for the foundation all stone required at 92 cents per cubic yard. The several bids on the work were as follows:

	Heavy riprap, per ton.	Filling stone per ton.	All stone required, per ton.
L. P. & J. A. Smith Co., Cleveland.....	$1.50	$1.16	$1.20
Carkin, Stickney & Cram, Detroit.....	1.80	1.30	....
J. B. Donnelly, Buffalo.....	.92	.92	.92
E. J. Belden, Syracuse.....	1.40	1.32	1.35
Kelly Island Lime & Transit Co., Cleveland	...	....	.97½
Michael Rabbit, Toledo	2.42	1.58	1.79

City officials at Milwaukee opened bids, a few days ago, for river dredging at that point, and it was thought at first that a mistake had been made on account of the low price asked for the work. The city's dredging will be done this year for just half what it cost in 1897. Adolph F. Buss, who is supposed to represent the C. H. Starke Dredging Co., offers to do Milwaukee river dredging at 7 cents per cubic yard and dredging in the Menominee and Kinnickinnic rivers at 6 cents. These bids are based on dredging that is estimated at 150,000 cubic yards in all.

Some time ago the United States engineer at San Francisco, Major E. L. B. Davis, opened bids for the construction of a breakwater at San Pedro harbor, a job which required 136,020 long tons of stone in foundation, 1,933,603 tons in substructure, 221,025 tons in superstructure, and 2,370 cubic yards of concrete work. A lake concern, Hingston & Woods of Buffalo were the lowest bidders for this big job. Some of the western contractors, who are unused to lake methods, declared that it would be impossible to do the San Pedro work at the prices submitted by the Buffalo firm. Hingston & Woods have not as yet secured this contract, on account of the pressure of war matters in Washington, but they have been trying to press the matter with war department officials, and will begin work during the coming summer if they get the contract.

Buying of Auxiliary Ships Not Overdone.

It is sometimes suggested that the government has gone to great lengths in buying and chartering ships for the present war, in view of the admitted superiority of our navy to Spain's and our advantage of position. But it went much further in similar preparations for the war of 1861. It bought or chartered at that time "everything afloat" in this country, according to Soley, "that could in any way be made to answer a purpose." The vessels were of all sizes and descriptions, from 2,000-tonners to tugs, the majority being between 100 and 800 tons. Among them were ferry-boats, on which guns were mounted, and one of the most valuable prizes of the war, the steamer Circassian, was captured outside of Havana by a Fulton ferry boat. There were purchased, up to December, 1861, according to this authority, seventy-nine steamers and fifty-eight sailing vessels, or 137 in all, and up to the end of the war 313 steamers, or 418 vessels in all. It will therefore be obvious that our government has not been extravagant, by comparison, in the present war. It is true that steamships, fast yachts and other vessels now average far higher in cost, and that no such American steamships then existed, in fact, as the St. Louis and her mates. It is also true that, taking togetner the Confederate coast line and the Mississippi and other river service, a greater aggregate length of patrol and blockade was required than in the case of Cuba and Porto Rico. The coasts, too, were studded with larger and more important cities. But, on the other hand, the Confederacy then began with no navy, and had hard work to create one, whereas Spain has many powerful warships, and possesses scores of gunboats and launches already in Cuban waters, besides a considerable merchant marine from which to draw auxiliary vessels.

It was found that while the urgency of the civil war caused some very doubtful vessels to be bought, as a whole the purchases were wise. The stake was so great that money was poured out like water, and, as Prof. Soley says, the board of inspection "could not exact a very high degree of excellence or fitness," because everything conceivably useful in some way seemed to be needed. We believe that our present auxiliary cruiser board has purchased with far greater discrimination than was then possible; and yet it turned out, in those earlier days, that even some very unpromising craft did good service against blockade runners, while the steamers Connecticut, Cuyler, De Soto and Santiago de Cuba paid for themselves several times over in the prizes they captured. When it is seen how small a section of the Cuban coast we are now blockading, from the lack of ships, the buying of auxiliaries, so far as numbers are concerned, cannot be called overdone. We now, too, must have a patrol fleet for our own coast, whereas during the civil war there was no danger that Confederate vessels would attack the northern seaboard.

One clear advantage we have thus far enjoyed is that of not needing to make costly outlays on poor naval material through hurry or panic. During the long civil war the goevrnment built in the navy yard and private yards scores of vessels, including many sloops-of-war of the Kearsarge class, the "ninety-day" gunboats, the double-enders of the Octarora and Monocacy classes, and various ironclads. Later in the war came many vessels built of unseasoned white oak timber instead of live oak, which began to decay as soon as launched, and some of them, costing over a million, made only one cruise, being then found too rotten to be repaired. But thus far in the war with Spain there have been no temptations to rush the work of construction, sacrificing everything to urgency. While many of the auxiliaries may have to be sold at less than half their cost, the ships built or bought for the permanent navy will probably be found good enough to stay in it when the war is over.—Commercial, New York.

Charts of Georgian bay will be required by most of the captains of vessels of the medium class during the present season, on account of the increasing traffic in that direction. The Marine Review has in stock at all times the best charts of Georgian bay that are made.

ERIE CANAL IMPROVEMENT FUNDS.

ANOTHER PLEA TO BE MADE IN A MOVEMENT FOR A SPECIAL SESSION OF THE NEW YORK LEGISLATURE—INTERVIEW WITH G. H. RAYMOND.

Buffalo, May 3.—The future of the Erie canal, New York state's great waterway, is in doubt. Its past is known to every intelligent vesselman on the great lakes. Its future prospects, its possibilities and its bearing on lake traffic are of vital interest to every vesselman. A short time ago an effort was made by friends of the canal to submit to the people of the state of New York a proposition to spend $7,000,000 more on canal improvements, the first appropriation of $9,000,000 having been exhausted. Just before the New York state legislature adjourned, a bill directing that such a proposition be submitted to the people was introduced. It was defeated. This was another blow for the friends of the canal. They have had others, however; have survived them and are as much alive today to the interests of the canal as ever.

When this bill was defeated it was thought nothing could be done in the interest of the canal until the next session of the legislature, which will not convene until January of next year. But those whose interests are assailed by the delay in the needed improvements have decided not to wait until next January to try to have the work on the canal done. They have decided to make an effort to have a special session of the legislature, so that an appropriation of $7,000,000 further to improve the canals can be voted. The friends of the canal are sincere in this effort and a special session of the legislature is being much talked of by canalmen in Buffalo. Your correspondent gives below an interview he had with G. H. Raymond of Buffalo in regard to the Erie canal. He seems confident a special session of the legislature will be held and believes the amount needed to improve the canals will be appropriated. It will be remembered that about three years ago Mr. Raymond introduced the idea of widening the locks of the Erie canal for strategic purposes in time of war and especially for commercial advantages. He was active in the $9,000,000 appropriation movement, and it is said he drew the $7,000,000 canal appropriation bill for additional work on the Erie canal, the one mentioned as being defeated at the last session of the New York legislature. Mr. Raymond is the owner of the only strictly non-pool elevator in Buffalo, and through his elevator last season was handled over one-fourth of all the grain traffic from Buffalo to tidewater over the Erie canal. He says:

"While it may seem a bold statement, it is nevertheless true that not in a generation has a matter of so much importance been considered as the present condition of this great state waterway. Its future is trembling in the balance. Its friends made a noble effort at the last session of the New York legislature to save it from being throttled by opposing interests, and succeeded in defeating the resolution, which, while nominally only seeking to put the Erie canal under government control, was simply another plan of preventing it being completed so as to be made available to compete with the railroads. The $9,000,000 having been found insufficient to complete the canals as contemplated, its friends made a further fight to obtain $7,000,000 more to complete the work, but failed. Ugly rumors have been circulated as to why this bill was not carried, which it may be best to pass over at this time. However, the fact remains that the fate of the canal was never more serious than today and its future never more uncertain. While it may appear to be a bold statement, yet in my judgment the failure to put the Erie canal in shape to compete with railroad interests out of Buffalo (and that very speedily) means the wiping out of the canal, the destruction of much of the commerce of New York and a most serious blow to the vessel interests on the great lakes. With the canal in disuse there would, of course, result the most stupendous railroad trust between the lakes and the sea that the world has ever seen. Rates would be whatever "J. Pierpont Morgan & Co." decided was necessary to earn dividends on the water and steals with which the railroad systems are now filled and honeycombed.

"The next step in the scheme would be the practical consolidation of the lake carrying interests in the hands of lake lines working in perfect harmony with the railroads from the lakes. It will be unnecessary to predict what would be the future for private interests invested in lake marine under such a state of things. It will require but a little apathy on the part of the friends of the Erie canal to have these worst fears easily realized. It requires at the same time but a little real hard work to bring about such a revolution in the Erie canal as will place it forever beyond the danger of being injured by the railroads and at the same time place the independent lake marine in a safe position. First, the Erie canal must be completed along the lines laid down in the $9,000,000 canal appropriation. A further effort is being made by friends of the canal to have a special session of the New York legislature to vote the sum necessary properly to complete the canal. In addition to this there still remains a further change in the canal system, which, while it involves but a trifle in comparison with the advantages to be derived, will yet cost several millions more. Boats on the present Erie canal are limited in size by the locks. If, therefore, one side of one tier of the locks was relaid simply 6 feet farther back than at present, it would give to boats of a capacity of 20,000 bushels of wheat all the room necessary. Less than $5,000,000 will suffice for this simple change, involving, as it does, not a single engineering difficulty. At the same time it would be desirable to change the slope of the prism in many places so as to give more sea room for the boats. The course of the canal at Syracuse should be changed also. The total expense would not exceed $10,000,000. With such a canal and such locks, and vessels towed in six-boat fleets as is now done with the smaller boats, and which is perfectly feasible with the larger boats, it would be possible to move wheat from Buffalo to New York at one cent a bushel and at a profit to the boatmen. Such a rate would practically prevent a bushel of grain or a pound of any other commodity moving to the seaboard except over the great lakes and the Erie canal. It would make it cheaper to move all the New England traffic by the great lakes and the Erie canal to the Hudson or the Harlem river, and there put it on cars for distribution. This is the canal the friends of the canal are looking for; this is the canal the food-growing states are so much interested in; this is the canal which will settle once and forever all possibility of a railroad monopoly that will strangle every interest that interferes with it and increase the cost of every article used as food by this great nation. New York state is rich enough to do this work alone. New York state is also, to its shame be it said, blind to this great proposition. The honest press of this country can assist in bringing this national matter to a successful issue. I doubt if there is sufficient State pride to complete this waterway without the aid of other states so largely interested."

Around the Lakes.

F. Shaw was recently appointed harbor master at Parry Sound, Ont.

Capt. Alexander Clarke, a pioneer of the "Soo" region, died at Point aux Pins, a few days ago.

Capt. F. W. Hawgood, superintendent of the F. & P. M. Ry. Co.'s steamship line on Lake Michigan, left the employ of that company May 1. The name of his successor has not as yet been announced.

Capt. Charles Peltier, a veteran vesselman, died in Detroit last Friday afternoon. Capt. Peltier was sixty-eight years of age, and from an early age had been connected with the lake trade. He was on a sailing vessel for many years, and was identified with several steam barge ventures. He sailed the B. W. Jenness for nineteen years.

The fixed red lantern light at Russell island (upper light No. 12) has been moved to the structure on the upper end of the shoal at the head of Russell island, and about 3,600 feet N. by E. ¾ E. from Russell island light No. 11, with which it will form a range to guide in the St. Clair river above the head of the shoal. The light will be 14 feet above the water. The structure consists of a crib, in 15 feet of water, surmounted by a white lantern house.

The biggest insurance certificate ever issued on a single cargo of grain on the lakes was written by J. J. Rardon & Co., a few days ago, on wheat aboard the Corrigan steel barge Australia, at Chicago. It was for $273,700. The cargo consisted of 210,539 bushels, and the wheat was insured at $1.30 a bushel, a price which has not appeared on insurance policies for many years before. It was shipped by A. Geddes & Co., acting for Joseph Leiter.

A powerful steel tug, probably the finest vessel of her kind on the lakes, was launched at the ship yard of the Union Dry Dock Co., Buffalo, on Saturday last. The vessel is for the Maytham line, to be used on Buffalo breakwater work, and was named Charles F. Dunbar. Dimensions are 91 feet length, 23 feet beam and 12 feet depth. The tug is equipped with a triple expansion engine, having cylinders of 17, 25 and 40 inches diameter and 27-inch stroke. Boilers are of the Roberts water tube type.

Wisconsin Steel Co. is the name of the corporation that has taken charge of the West Superior steel plant since it passed into the hands of John D. Rockefeller, recently, through mortgage foreclosure sale. Officers and directors of the new company are: Frederick T. Gates, president; Henry W. de Forest, vice-president; Edward V. Carey, secretary and treasurer, and George Wellwood Murray, general counsel; directors—John Rockefeller, Jr., Frederick T. Gates, George Wellwood Murray, Henry W. de Forest and Colgate Hoyt.

Major Thomas W. Symons, United States engineer at Buffalo, asks that attention be directed to the following notice: "By direction of the secretary of war, all persons are warned that it is dangerous to navigate the waters of the east end of Lake Erie between the southern end of the present Buffalo breakwater and Stony point, where the new breakwater is now under construction, and all persons so navigating do so at their own risk. And further, all persons are warned that the operations of the government contractors engaged in extending the breakwater must not be interfered with."

The Western Transit Co.'s new steamer, on which work is well advanced at the Wyandotte ship yard of the Detroit Dry Dock Co., is expected to be ready for business about July 1. This steamer will undoubtedly be one of the finest package freight carriers on the lakes. The Detroit company was not held down to close competition in bidding for this contract and it is the intention to turn out a boat that will be modern in every way. The new steamer will be 400 feet in length, 45½ feet beam and 28 feet molded depth. She will have six gangways on each side, five compartments for storage of freight in the hold, with eleven hatches on main deck and nine on her spar deck. She will have two steel masts and two complete electric light plants, entirely independent of each other. Two large hoisting engines for loading and removing cargo will be put in. Her main engines will be of the quadruple expansion type, with cylinders of 19, 27½, 40 and 58 inches diameter, and 42-inch stroke. They will be given three Scotch type boilers 11 feet in diameter and 11 feet 6 inches in length, with a working pressure of 210 pounds of steam. The new craft will have a carrying capacity of 5,000 tons, and is guaranteed to make 13 miles an hour when fully loaded.

Parry Sound Harbor.

Mr. Geo. J. Harris, general western agent of the Canada Atlantic Transit Co., sends the Review the following copy of a letter from Capt. John Massey of the steamer Linn, relative to Parry Sound harbor:

Geo. J. Harris, Chicago: Dear Sir:—I arrived in Parry Sound Saturday night, 23d inst., at 7 p. m., all O. K. I found no difficulty coming into this harbor drawing 18 feet of water. We came nearly all the way full speed, and it is the finest harbor I ever saw. It is land locked all round and there is lots of water. They are going to put a gas buoy on the Seguin banks, just outside Red Rock light, and another one about half-way in on a 14-foot spot that is in nearly mid-channel, and then this will be a good place to come to. It is a far better place than Midland.

JOHN MASSEY.

Parry Sound, April 25, 1898.

The Big Four ticket office and D. Jay Collver have removed from Superior street to the Colonial Arcade, No. 116 Euclid avenue. Mr. Collver is ready at all times to advise as to best routes of travel and best places to go for health and pleasure.

Naval Auxiliary Fleet.

A list of 132 steam vessels that have come into possession of the navy department since preparations for war were begun is printed herewith. Some twenty-five of these vessels were taken over from the revenue cutter service, fish commission and light-house service, and a few others, notably the big passenger steamers of the American line, are as yet only chartered to the government, but all the others were purchased outright, and they are being fitted in great numbers as rapidly as possible for the service that will be required of them as auxiliary cruisers, gunboats, torpedo boats, transports, colliers, scout boats, etc. This list was secured from various sources, the navy department refusing to give out information of this kind. It is complete to May 1, however, and has been carefully prepared in accordance with special facilities which the Review has for compiling such information.

Strength in Deck Erections.

A noticeable feature in recent ship construction is the value assigned to deck erections as elements of structural strength. There was a time, so the Engineer of London recently said, when, if a long bridge were built upon an upper deck, the vessel was penalized by having her sheerstrake doubled. Nowadays the fitting of a long bridge is insisted upon in vessels of large size and extra proportions, because of the strength which such an erection contributes when properly constructed. In cases, too, wherein the building of a bridge house is not insisted upon, instead of penalizing the vessel by doubling the sheerstrake throughout, the doubling is required at the bridge ends only, and material which would otherwise be put into the sheerstrake in way of the bridge house is advantageously transferred to the bridge house plating. It is, in fact, generally recognized that a long deck erection in the midship half length of the vessel should properly be a source of strength rather than the contrary. To make it such, however, it must be treated as an integral part of the structure and as the top of the girder. If not made strong enough to resist the stresses coming upon it, better by far to cut it asunder in sections, so that it may work rather than break. Long bridge houses in passenger liners now have continuous steel decks, additionally thickened side plating, and the landings of such plating double, instead of single, riveted either for the entire length of erection or certainly for some 20 feet or so at the ends, where the shearing stresses are greatest.—Cassier's Magazine.

A Marvellous Craft.

Unquestionably the millenium in naval construction has been reached if there be any truth in the following description of a destroy-all boat, which was taken from an Argentina newspaper:

"Thomas Bridge of Eastbourne claims to have invented a boat which promises not only to revolutionize our system of building, but also to be a very formidable instrument in naval warfare. The method of construction is naturally a profound secret, but the virtues of this novel boat are openly declared. The inventor claims that it will carry an explosive bomb weighing a ton and place it under a man-of-war without any risk of detection or damage to itself. It also carries a cylinder from which a liquid fire, at present unknown to science, can be projected onto any vessel and set it on fire from stem to stern. It can be riddled with bullets, and yet keep its buoyancy, and no collision, however violent, can sink it. It is impelled by some new form of powder which requires neither coal nor any form of fuel for its generation, and it may be made either of wood or steel. The buoyancy of this marvellous craft is such that if it were drawn into the vortex of a sinking battleship it would not be dragged more than a few inches under the surface. The principle of construction can be applied equally to a 10,000-ton man-of-war or a lifeboat, to the latter of which the inventor has so far confined his attention."

A Memorable Storm on the Lakes.

The storm that has the greatest cause to be remembered in lake shipping circles swept over Lake Michigan Oct. 16, 1880, nearly eighteen years ago. The weather on Oct. 15 was warm and pleasant, the thermometer ranging from 60° to 70°. Light northerly winds prevailed over Lake Superior and southerly over Lake Michigan. The storm began about midnight of the 16th with easterly shifting to southwesterly winds at the Straits of Mackinac and southwesterly from Grand Haven southward. The barometer fell to 28 inches (unreduced) in Minnesota on the morning of the 16th and continued low throughout the upper lakes until the morning of the 17th. Violent southwesterly gales on Lake Michigan raged all day of the 16th and part of the 17th. The temperature dropped from 65° to the freezing point and snow fell as far south as Chicago. The loss of life was very great, nearly one hundred souls going down on the Goodrich liner Alpena, Grand Haven to Chicago. This vessel was last seen about thirty miles from Chicago. In all about ninety vessels were wrecked or badly damaged and 118 lives were lost as the result of this storm.—Government weather chart.

Production of Rails.

Reports recently prepared by the American Iron & Steel Association show that the production in the United States in 1897 of all kinds of rails, including light and heavy rails, and street, electric and mine rails, was 1,647,892 gross tons, against 1,122,010 tons in 1896, an increase of 525,882 tons, or over 46 per cent. The production of 1897 was composed of 1,614,399 tons of Bessemer steel rails rolled by the producers of domestic ingots; 30,121 tons of Bessemer steel rails re-rolled from old steel rails and rolled from purchased blooms; 500 tons of open-hearth steel rails; and 2,872 tons of iron rails. The total production of Bessemer steel rails in 1897 was 1,644,520 gross tons, against 1,116,958 tons in 1896. Of the production of 1897, Pennsylvania made 1,027,996 tons, as compared with 674,096 tons in 1896; Illinois and the remainder of the country made 616,524 tons, against 442,862 tons in 1896.

SHIPS PURCHASED BY UNCLE SAM.

Name when purchased.	Name in Navy.	Purchased from.	Type before purchase.	To be used as.	Gross tonnage.
Amazonas	New Orleans	Brazil	Cruiser	Cruiser	3450
Abreuall	Albany	Brazil	Cruiser	Cruiser	3450
D. C. Ivins	Nezinscot	Moran Towing Co.	Tug	Scout boat	115
Alicia	Hornet	H. M. Flagler	Yacht	Torpedo boat	302
Almy	Eagle	F. Gallatin	Yacht	Torpedo boat	365
Hermoine	Hawk	Henry L. Pierce	Yacht	Torpedo boat	360
Columbia	Wasp	J. H. Ladew	Yacht	Torpedo boat	380
E.F. Luckenback	Tecumseh	L. Luckenback	Tug	Scout boat	284
W A.Luckenback	Uncas	L. Luckenback	Tug	Scout boat	284
Winthrop	Osceola	Staples Coal Co.	Tug	Scout boat	352
P. H. Wise	Sioux	Moran Towing Co.	Tug	Scout boat	111
El Toro	Algonquin	Morgan Line	Tug	Scout boat	130
Somers	Somers	In England	Torpedo boat	Torpedo boat	120
Atlas	Wampatuck	Standard Oil Co.	Tug	Scout boat	324
Alice	Alice		Steam lighter	Steam lighter	400
Josephine	Vixen	P. A. B. Widener	Yacht	Torpedo boat	546
Mayflower	Mayflower	Ogden Goelet	Yacht	Aux. cruiser	1475
Sovereign	Scorpion	M. C. D. Borden	Yacht	Torpedo boat	628
Creole	Solace	Cromwell S. S. Co.	Pass. steamer	Hospital ship	3802
Diogenes	Topeka	English ship builders	Cruiser	Cruiser	1800
	Manly	Yarrow Co	Torpedo boat	Torpedo boat	45
Saturn	Saturn	Boston Tow Boat Co.	Coal transp't	Coal transport	2268
Venezuela	Panther	Boulton, Bliss & Dallett	Freight stmr.	Transport	2483
Yumari	Badger	Jas. E. Ward & Co.	Freight stmr.	Aux. cruiser	3797
Yorktown	Resolute	Old Dominion S.S. Co.	Pass. steamer	Aux. cruiser	2898
Nichteroy	Nichteroy	Brazil	Dynamite cr.	Dynam. cruiser	7080
Sterling		C. A. Campbell	Collier	Collier	2016
Zafiro		China & Manila S.S.	Collier	Collier	1062
Menemsha		T. Hogan & Co.	Collier	Collier	2743
Juniata		M. & M. T. Co.	Frt. vessel	Repair ship	2552
Niagara		Ward Line	Frt. steamer	Repair ship	2265
Peerless	Peerless	J. W. Harkness	Yacht	Scout boat	228
Mangrove	Mangrove	Light House Service	Tender	Dispatch boat	250
Bache	Bache	Coast Survey	Tender	Dispatch boat	182
Blake	Blake	Coast Survey	Tender	Dispatch boat	234
Regulus		Harvey & Co., England	Collier	Collier	1367
Grand Lake		Newfoundland Owners	Frt. steamer	Gunboat	896
T. P. Fowler		Cornell Stmbt Co	Tug	Scout boat	161
Aileen		Richard Stevens	Yacht	Scout boat	151
Philadelphia		Philadelphia Pilots	Pilot boat	Picket boat	300
A. W. Booth		M. Moran	Tug	Scout boat	115
Vergana		F. H. Benedict	Yacht	Torpedo boat	128
Hiawatha		Chas. Fleischmann	Yacht	Torpedo boat	219
Ituna		A. V. Armour	Yacht	Torpedo boat	171
Au Revoir		Wm. Dupont	Yacht	Torpedo boat	342
Merrimac	Merrimac	T. Hogan & Sons	Collier	Collier	1399
Lebanon	Lebanon	Phil. & Reading R.R.Co	Collier	Collier	1486
Nan Shan	Nan Shan	China & Manila Co	Collier	Store ship	2200
New York	Harvard	International Nav. Co.	Pass. steamer	Aux. cruiser	10803
Paris	Yale	International Nav. Co.	Pass. steamer	Aux. cruiser	10795
St. Paul	St. Paul	International Nav. Co.	Pass. steamer	Aux. cruiser	11630
St. Louis	St. Louis	International Nav. Co.	Pass. steamer	Aux. cruiser	11630
Philadelphia	Peoria	Boulton, Bliss & Dallett	Frt. steamer	Aux. cruiser	2526
Penelope	Yankton	H. E. Converse, Boston	Yacht	Torpedo boat	541
Corsair	Gloucester	J. P. Morgan	Yacht	Aux. cruiser	560
Illawari	Oneida	Engene Tompkins	Yacht	Torpedo boat	118
Thespia	Hist	David Dows, Jr.	Yacht	Torpedo boat	312
Viking	Viking	Horace A. Hutchins	Yacht	Torpedo boat	141
Restless	Restless	Hiram W. Sidley	Yacht	Torpedo boat	105
Hercules	Hercules	Standard Oil Co.	Tug	Scout boat	142
Southery	Southery	L. Luckenback	Collier	Collier	2068
R. W. Wilmot	Potomac	New Orleans parties	Tug	Scout boat	280
El Norte	Yankee	Morgan Line	Frt. steamer	Aux. cruiser	4659
El Rio	Prairie	Morgan Line	Frt. steamer	Aux. cruiser	4665
El Sol	Yosemite	Morgan Line	Frt. steamer	Aux. cruiser	4523
El Sud	Dixie	Morgan Line	Frt. steamer	Aux. cruiser	4659
C.G. Coyle	Choctaw		Tug	Scout boat	315
Penwood	Powhatan		Tug	Scout boat	156
Fearless	Fearless	Claus Spreckels	Tug	Scout boat	646
Active	Active		Tug	Scout boat	273
Vigilant	Vigilant	J. B. Spreckels	Tug	Scout boat	261
	Felicia		Yacht	Torpedo boat	150
	Plymouth	Central R, R. of N. J.	Tug	Scout boat	428
	Honeybrook	Central R. R. of N. J.	Tug	Scout boat	428
	R. C. Viet		Tug	Scout boat	192
	Mary Wittich		Tug	Scout boat	126
Shawmut			Collier	Collier	1624
Aegusa		Florio, Italy		Gunboat	1242
Albatross	Albatross	U. S. Fish Commission	Tender	Gunboat	688
Appomattox		Chesapeake & Ohio RR	Collier	Collier	2875
Argus		J. A. Wright	Tug	Scout boat	171
Armeria	Armeria	Light-House Service	Tender	Dispatch boat	150
Bascir		Morocco			
Chatham		M. & M. T. Co.		Repair ship	2729
Fish Hawk	Fish Hawk	U. S. Fish Com.		Gunboat	441
Free Lance		F. A. Schermerhorn	Yacht	Scout boat	132
Harrisburg		Phil. & Reading Co.	Collier	Collier	1283
Huntress		F. C. Flower	Tug	Scout boat	56
Justin		Justin Co., London	Collier	Collier	2206
Kansas City		Savannah Line	Frt. Steamer	Aux. cruiser	3679
Lake Ontario		H. E. Murray	Collier	Collier	4289
Lucerne		Allan Line	Collier	Collier	2200
Maple	Maple	Light-House Service	Tender	Dispatch boat	392
New England		N. E. Fish Assn.	Tug	Torpedo boat	250
Newport		Pacific Mail Co.	Collier	Collier	2735
Nourmahal		J. J. Astor	Yacht	Torpedo boat	745
Pottsville		Phil. & Reading Ry.	Collier	Collier	1283
Right Arm		Chapman Wreck. Co.	Tug	Scout boat	238
Sally		Arthur Lyman	Tug	Scout boat	10
	Samoset		Tug	Scout boat	200
Mayflower	Suwanee	Light-house service	Tender	Dispatch Boat	
Tupy		Brazil		Gunboat	1030
Varuna		J. M. Sears	Tug	Scoutboat	57
Alleghany		Merch. & Miners' Line	Frt. Steamer	Transport	1433
Ontario		Beaver Line (British)	Frt. Steamer	Aux. Cruiser	2200
Comal		Mallory Line	Frt. Steamer	Transport	2034
Alamo		Mallory Line	Frt. Steamer	Transport	2942
Alleghany		Merch. & Miners' Line.	Frt. Steamer	Transport	2014
Berkshire		Merch. & Miners' Line.	Frt. Steamer	Transport	2014
D. H. Miller		Merch. & Miners' Line.	Frt. Steamer	Transport	2014
Comanche		H. M. Hanna	Yacht	Torpedo boat	357
Algonquin	Accomac	U. S. Treasury Dept.	Cutter	Dispatch boat	900
Calumet	Calumet	U. S. Treasury Dept.	Cutter	Dispatch boat	123
Corwin	Corwin	U. S. Treasury Dept.	Cutter	Dispatch boat	213
Dexter	Dexter	U. S. Treasury Dept.	Cutter	Dispatch boat	188
Forward	Forward	U. S. Treasury Dept.	Cutter	Dispatch boat	267
Galveston	Galveston	U. S. Treasury Dept.	Cutter	Dispatch boat	416
Grant	Grant	U. S. Treasury Dept.	Cutter	Dispatch boat	263
Gresham	Gresham	U. S. Treasury Dept.	Cutter	Dispatch boat	777
Guthrie	Guthrie	U. S. Treasury Dept.	Cutter	Dispatch boat	98
Hamilton	Hamilton	U. S. Treasury Dept.	Cutter	Disyotch boat	223
Hudson	Hudson	U. S. Treasury Dept.	Cutter	Dispatch boat	128
Manning	Manning	U. S. Treasury Dept.	Cutter	Dispatch boat	980
McCulloch	McCulloch	U. S. Treasury Dept.	Cutter	Dispatch boat	1280
McLane	McLane	U. S. Treasury Dept.	Cutter	Dispatch boat	315
Morrill	Morrill	U. S. Treasury Dept.	Cutter	Dispatch boat	288
Onondaga	Onondaga	U. S. Treasury Dept.	Cutter	Dispatch boat	908
Perry	Perry	U. S. Treasury Dept.	Cutter	Dispatch boat	282
Rush	Rush	U. S. Treasury Dept.	Cutter	Dispatch boat	300
Windom	Windom	U. S. Treasury Dept.	Cutter	Dispatch boat	398
Woodbury	Woodbury	U. S. Treasury Dept.	Cutter	Dispatch boat	330

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio, by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, $1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1897, contained the names of 3,230 vessels, of 1,410,102.60 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1897, was 399, and their aggregate gross tonnage 769,366.68; the number of vessels of this class owned in all other parts of the country on the same date was 314, and their tonnage 685,709.07, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1897, was as follows.

	Number.	Gross Tonnage.
Steam vessels	1,775	577,235.45
Sailing vessels and barges	1,094	894,888.87
Canal boats	361	37,978.28
Total	3,230	1,410,102.60

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
" " " 1896	117	108,782.38
" " " 1897	120	116,936.98
Total	611	403,327.91

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canals.			Suez Canal.		
	1897	1896	1895	1897	1896	1895
Number of vessel passages	17,171	18,615	17,956	2,986	3,409	3,434
Tonnage, net registered	17,619,933	17,249,418	16,806,781	7,899,374	8,560,284	8,448,383
Days of navigation	234	232	231	365	365	365

A system of incandescent-lamp signalling, provided by the Telephotos Co. of Buffalo, is being fitted to several vessels of the United States navy. A series of four double lanterns, lighted by powerful groups of incandescent lamps are hung vertically on strong wire cables, the upper end of which can be run up to a mast or yard arm, while the lower end is intended to be fastened to the deck of the vessel. The upper half of each lantern is white, and has within it a group of three lamps surrounded by powerful lenses. The lower half is red and has four lamps, in order to make the red beams the stronger. The cable supplying the lamps passes to the deck, or the bridge, where a keyboard enables the operator to spell out the code signals very much in the same manner as a typewriter is manipulated. The keyboard is arranged on a standard and enclosed like a binnacle, and while operating it the operator stands. By an automatic arrangement, each key when depressed lights a combination of the four red and the four white lights, making a letter or a number, according to the code of signals. Another feature of the keyboard is that, when one letter is down all the other keys are locked, so that another cannot be accidentally pushed down and confuse the signals. This will be recognized as a very valuable feature of the machine. Any key pressed down can be turned one-quarter way around like a screw, which motion locks it in place and leaves the signal burning in case it is desired to use it as a standing signal for an order in the secret naval code. Thus the keyboard can be used to telegraph ordinary instructions by the usual letters, or to send a cipher dispatch or special code orders.

"It is rather noteworthy," says the Marine Engineer of London, "that not one of all the palatial and speedy steam yachts, so many of which have been built within recent years, can cross the Atlantic at anything like full speed, under their own steam, without in some way recoaling. This problem of the coal endurance necessary to cross the Atlantic at as near top speed as possible throughout the voyage, is being tackled by G. L. Watson, the well-known designer of Glasgow, in the magnificent vessel he is at present planning for James Gordon Bennett of the New York Herald. The record in this matter is at present held by the Varuna, designed by Mr. Watson for Eugene Higgins of New York, which vessel succeeded in accomplishing the voyage at an average speed of 13½ knots —very much below the maximum of which she was capable. The length of Mr. Bennett's vessel is to be 310 feet, and she is to have engines of the quadruple-expansion four-crank type, capable of developing 7,000 indicated horse power. The bunker capacity will be such that the paramount condition of steaming acress the Atlantic at 17 knots speed without recoaling will be fulfilled. This same requirement will be carried out in the yacht building at the Bath Iron Works, Bath, Me., for Col. Oliver H. Payne. Col. Payne's yacht is to be 300 feet long and 35 feet beam, and will have enormous coal capacity.

It is not surprising that lake ship builders are meeting with difficulty in securing material for new ships from the steel mills. The wonder is that they have been thus far able to hold their forces of workmen, as ship yards from one end to the other of the Atlantic coast have been rushed with special naval orders, and machine shops that never before engaged in marine work have day and night forces working on these orders. The work of altering auxiliary naval vessels is drawing on the entire forces of the larger ship yards on the coast. Many of the men at the Newport News works are putting in eighteen hours a day. The pay roll at these works for a single week now amounts to about $50,000.

Affairs of the White Star steamship line in this country are now managed by a committee of three representatives in the New York office. The management is divided into three departments, and each department is handled by a capable man. The committee consists of S. S. Cortis, John Lee and E. J. Adams. Each man is peculiarly fitted for his special line, and is absolute in his own department. On questions of general management, when instructions are not laid down by the head office, the committee decide by vote. The line has been enjoying unusual prosperity, and the conduct of its affairs in this city, it is understood, meets the approval of the directors.

Canadian government officials still hold out against the use of canals on Sunday. Last year the Canadian Marine Association sent several deputations to Ottawa to confer with the Hon. Mr. Blair, minister of railways and canals, with a view to having the canals closed at 6 o'clock on Sunday morning and opened again at 9 p. m. This would give to them three hours earlier than under the old system. While no hope was held out last year by the government, the marine men felt that this year their request would be granted, but they were informed, a few days ago, that the government had definitely decided not to grant their request.

The steel car and mastodon locomotive, as well as the 100-pound steel rail, are creations of the past two or three years. They are all found on the Carnegie ore and coal railway, running from Conneaut on Lake Erie to Pittsburg. Other railways of Ohio and Pennsylvania that share in the coal and ore business will be similarly equipped within the next year or two. These are the improvements that cause some people in the iron business to look for an output of close to 20,000,000 gross tons of ore from the Lake Superior iron region in 1900. The ship yards of the lakes are already equipped to provide vessels for such a tonnage when it is needed.

The fact that the United States battleship Oregon is compelled to sail around South America in order to get to her Atlantic destination, which, from her San Francisco starting point, is only about three thousand miles as the crow flies, serves to bring forcibly home the value of the Nicaragua canal as a short route between the Pacific and the Atlantic ports. As is significantly pointed out, what has happened to the Oregon might happen to an entire fleet, and inasmuch as we can never assure to ourselves freedom from war, the country can at no time count itself safe against attack on both coasts.—Commercial, New York.

The announcement in England that the Armstrongs, famous builders of ships and guns, have sold the right to manufacture their patent Elswick torpedo discharging apparatus to the United States has excited great interest among the shareholders, who are speculating on the sum that has been realized. There is a strong impression that the consideration for the right to use this device amounts to a substantial figure, and will add very appreciably to the profits of the company.

Capt. C. V. Gridley of the Olympia and Commander P. B. Lamberton of the Boston, both of whom were in the recent fight at Manila, are well known on the lakes. Capt. Gridley was in charge of the tenth light-house district, a few years ago, with headquarters at Buffalo, and Commander Lamberton, who was in the light-house service up to a few months ago, made a trip up the lakes last summer with Capt. Geo. P. McKay and other officers of the Lake Carriers' Association.

There are all sorts of rumors going the rounds of eastern newspapers regarding new vessels to be built for coast lines to replace those sold to the government. It is stated in one instance that the Newport News company will build two steamers for the Morgan line and two others for the Cromwell line, all modern in every particular. Another item is to the effect that the Roach yard, Chester, Pa., will certainly build two steamers for the Morgan line. Take your choice.

On a recent eastward voyage the time of the Cunard line steamer Lucania crossing the Atlantic was 5 days, 11 hours and 54 minutes. The distance traversed was 2,897 knots, or an average of 21.99 knots an hour. Her daily runs were 536 knots, 513 knots, 533 knots, 501 knots, 505 knots and 309 knots. On one day she steamed at the rate of over 23 knots an hour, which is a record for an ocean steamer.

At a recent meeting of the board of directors of the Roach ship yard. Chester, Pa., Wm. C. Sproul was elected to the office of vice-president of the company. This office is a new one and was created by the board in recognition of Mr. Sproul's services to the company. Mr. Sproul is a son-in-law of John B. Roach and has been a director of the company and identified with the works in many ways.

Here is an indication of progress in exports of American steel products and machinery: An eastern manufacturer who visited Birmingham, England, not long ago, says that the street trolleys in that city are constructed of rails made in Pittsburg, the cars were from Philadelphia, the boilers from Erie, the engines from Milwaukee, and the general electric fittings from Schenectady.

Henry W. Cramp, vice-president of the Cramp company, announces that the launching of the battleship Alabama, which will take place next month, will be private. No invitations will be issued, and only a few government officials will be present.

Tonnage of Howard Gould's yacht Niagara, building at Wilmington, Del., is 1,443.87 gross and 703.18 net. This yacht is one of the largest and finest vessels of her kind in the world.

The Lakes in 1940.

A Cleveland vessel owner who visited Port Huron recently was impressed with the great stream of ships up and down the river at that point on a day when the passages were very numerous. He is given to reflections on the future of lake commerce. He made a sketch conveying his ideas of the ship of the future, which is reproduced herewith, and then wrote as follows to a Cleveland business associate, dating the letter Port Huron, July 1, 1940:

"I think it was in 1898, when I was quite young, that I left these waters with little thought of what forty years would bring forth. At that time your city was a thriving town of about 350,000, Chicago over a million, and Buffalo about the same as Cleveland. There were many wooden vessels on the lakes then. The change from wood to steel had just been fairly started, and the larger class of steel vessels were thought enormous for those times, some of them carrying all the way from 5,000 to 6,000 tons. I remember well when the Bessemer fleet came out with its big steamers and consorts. What carriers they were! Then a man by the name of 'Jim' Corrigan built some tow barges—great saw-log looking affairs but profitable carriers. And now that I think of it, only the other day, while seated at Joe Bedore's (the place still retains the name of the Frenchman of muskrat fame) the Polynesia passed down, bound from New Orleans to Detroit, and I was surprised to notice that she was going under her own power, with 'Windy' Young, who has had a second trial on earth and is doing well, perched up on the pilot house. She has twin screws now, and I understand is still a money maker. She carries only a small jag, but is suited to the New Orleans trade.

"There are few of the old fleet of '97 still in existence. What a change is here! Most of the fleet now are 1,000-footers, some of them 100 feet wide and 50 feet deep. They load to a draft of 40 feet, and instead of the good old times when we got 60 cents a ton on iron ore from Duluth, these craft are carrying it for 4¾ cents a ton. What riches would be in the business now if the good old days of '97 were to come back with that 60-cent ore freight. I find there are practically only three corporations owning boats, where there used to be many, not counting the individual owners. One of these combinations is in control of the ore and coal, the other the grain and package freight, and the third the lumber. Of course there are some outsiders, but they do not cut much of a figure. Ships of the big concerns are all of the largest and most approved type, with crews of 300 and 400. Electricity is the motive power and most of them have triple screws. A few of the older class have twin screws.

"I saw the old Northwest and North Land down at Detroit the other day. They are doing a ferry business between Detroit and Windsor. You remember what a fine pair they were when they came out, and how elegantly they were fitted up. They were discarded by the Northern company in 1910 and rebuilt for ferry service after Harvey Goulder knocked out the last attempt to bridge the Detroit river. While I was down at Buffalo last week I went aboard one of the Chicago Ship Building Co.'s latest products. What a great ship yard has been built up from Babcock's early efforts! This ship was discharging a million bushels of corn into lighters, and I was astonished to see that one of the lighters was the old Amazon, formerly owned by the Corrigans of your city. These lighters now take the cargoes from boats outside of Buffalo and tow down the Erie canal to New York, and unload right into steamers for Europe. This boat from the Chicago works is an immense affair. Her name I have forgotten, but I think it was South Chicago.

"A voyage on one of these ships is delightful. You get up in the morning and have a trolley car ride to breakfast aft. After spending the day with the captain forward you put on your dress suit and attend grand opera at the midship theater in the evening, or pass a pleasant time in the ten-story roof garden over the theater; or still better, you may have a siesta down in the palm garden between decks with old Fred Starke (if he happens to be on board), all of which, I assure you, is very different from the way things used to be when I first visited the lakes.

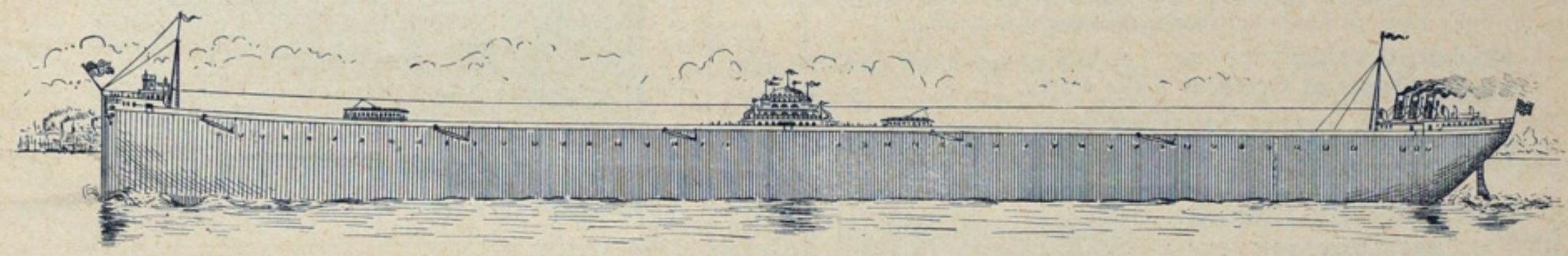
"I met John Mitchell of Cleveland the other day, and he is still hale, hearty and ticklish. He tells me that all the old channels were deepened to 50 feet and widened, and there is now a straight channel without a curve in it from Cleveland to Duluth. This was all accomplished by special act of congress, largely through the efforts of W. J. Conners of stevedore fame, who was sent to Washington by the vessel men for his game fight in the second grain shoveling struggle during the spring of 1899. And they tell me that the Cleveland docks are all on the lake front now! This is as I had expected, but I was surprised to learn that the old Cuyahoga had been filled up with mud from Shaker Heights. Mitchell tells me that Collier and Grover in old age have been against improvements and made a terrible kick against filling up the old creek. But I am not sorry that the river was filled up on them. My friendship toward them was at an end when, during the war with Spain, they bought those two old vessels—Badger State and Empire State, I think the names were—with the deliberate intention of carrying deserters to Canada. Well, I am off for Hudson bay tonight on one of the ships of 'Tom' Newman's new line and will write you from that point regarding the discovery of the north pole by Fitz, that old friend of yours from Pabstville."

Subscribers who wish to have the Marine Review delivered to them through the marine postoffice, Detroit, will please notify us at once.

Ship Yards a Part of Naval Strength.

In the Nineteenth Century for April, under the head of "British Ships in Foreign Navies," Mr. Archibald S. Hurd shows how private ship building yards in England are allowed to supply other nations with all sorts of warships, without any regard to the friendliness or unfriendliness of the purchasing nation. Just now, with the greatest naval war since Nelson's day imminent, this subject is of special interest on this side of the Atlantic. The United States and France are the only great powers which rely upon domestic ship yards, governmental or private, for war ships. Among the minor states the exceptions to the general rule of dependence upon Great Britain are little Uruguay, Paraguay and Bulgaria. A bald and categorical statement in detail is given of the number and kind of vessels of war now in foreign navies which were built in Great Britain. Their total displacement is 377,815 tons. That is about 25 per cent. of the entire tonnage of the British navy, including the antiques, which are only one remove from derelicts. Of this tonnage Turkey has 46,328; Chili, 32,965; Spain, 31,621; Japan, 30,053; Germany, 26,271 and Portugal, 21,916. The first and the last are not to be feared by Great Britain in any event, but Germany is in many ways a close rival, and always a possible enemy. Not only does Great Britain allow free trade in ships of war, but it freely lends its naval officers to man them and allows foreigners to be trained in the British navy. In every way the expenditure of vast sums of money on naval power is encouraged. Those expenditures, for the most part, pay toll, and heavy toll, to Great Britain.

Mr. Hurd sees in this policy confirmation of Napoleon's gibe that the British are a nation of shopkeepers, but this is a narrow view of the subject. If Great Britain were really in danger of naval warfare on a large scale, every ship, great and small, on the stocks would be seized by the government under a species of the law of eminent domain. Ship yards are really a part of the naval strength of a nation. The American policy of developing naval construction at home is no small part of the advantage this country now has over Spain, which, in the event of war, will be cut off by the laws of nations from procuring warships from any foreign source, while this country can enlarge and stimulate the industry indefinitely. The time will soon come when the United States will be a formidable competitor of Great Britain in the line of naval construction for the general market.—Inter-Ocean, Chicago.



LAKE SHIP OF THE FUTURE.

British Ship Yards Booming—Ships for the World.

The boom in British ship yards following the engineering troubles has assumed such proportions that it is expected the tonnage put into the water this year will exceed the output of 1889, which has been assumed to be nearly indicative of the maximum capacity of the yards. Altogether, including both warships and other vessels, 701 craft were building in the public and private yards of the United Kingdom during the first three months of this present year. Of these, 606 were merchant vessels, of a gross tonnage of 1,185,121, as against 428 vessels of 828,481 tons building in the first quarter of 1897. Of the ninety-five warships, of 355,934 tons gross, sixty-five were for the British navy and thirty for foreigners. For the British navy there were seven first-class battleships, seven first, five second, and ten third-class protective cruisers, four gunboats, two sloops, twenty-nine torpedo destroyers, and one royal yacht. Sixteen vessels were being built in the royal dock yards and seventy-nine in private yards. Practically the whole of the merchant tonnage under construction—606 vessels, of 1,185,121 tons—consisted of steamers, there being only 4,085 tons of sail. The sailing ships are of little importance, as they are, with one exception, of less than 100 tons each.

Of the 606 merchant vessels, 469 (of 920,926 tons) were for British owners, and ten (of 19,400 tons) for the colonies. Taking tonnage, Japan is again England's best customer with nine vessels of 40,010 tons; but going by vessels Russia stands first with twenty vessels of 33,276 tons. Then, on this basis, Denmark comes next with fourteen vessels of 25,915 tons, followed by Holland, eleven vessels, 19,155 tons; Spain, ten vessels, 26,330 tons; Belgium, six vessels, 8,236 tons; Sweden, six vessels, 6,845 tons; Norway, five vessels, 14,671 tons; Germany, four vessels, 18,200 tons; France, four vessels, 3,250 tons; and Chili, China, Monaco and Roumania, one each of 2,553 tons, 1,965 tons, 1,250 tons and 3,000 tons respectively. There were also thirty-four vessels of 40,089 tons under construction for sale or for owners whose nationality was not stated.

A Battleship and Cruiser for Russia.

A Philadelphia dispatch announces that the William Cramp & Son Ship & Engine Building Co. has been advised by Mr. Charles H. Cramp, president of the company, who went to Russia some weeks ago and who is expected home in the latter part of the week, that he has closed a contract with the Russian government for a heavy armored battleship of 12,500 tons displacement and speed of 18 knots throughout a sustained trial of twelve hours' duration, and one armored cruiser of a late type of 6,100 tons displacement and a speed average of 23 knots. These will be the first vessels of war for the Russian government built in foreign ship yards.

$1.50 to Columbus and return via the popular Nickel Plate road, Sunday, May 8. Good going and returning same day. Excellent service. 42

Proposed Tonnage Tax.

Although it is announced from Washington that the senate finance committee will omit the tonnage tax clause from the proposed Dingley revenue bill, most of the leading newspapers of the country are disposed to continue the fight in favor of this tax. All of the New York papers are now printing lengthy editorials on the subject. The Commercial says:

"A report recently prepared by the United States commissioner of navigation shows that this country expends $20,000,000 for the benefit of navigation as compared with similar expenditures aggregating only $25,000,000 on the part of the United Kingdom. The total tonnage entering at, and clearing from, English ports is 60,180,754 tons, while ours is but 42,403,769 tons. As affecting our foreign trade, it is pointed out by the commissioner that foreign vessels make three times as much use of the results of our expenditures for improvement in navigation on our seacoasts as do American vessels. In the matter of tonnage taxes, we are more liberal toward German steamships than is the port of Hamburg. The foreign shipping engaged at French ports pays two-thirds of that country's navigation dues. The British parliament has just rejected a bill that proposed to reduce the English light-house dues, and insists that merchant shipping shall continue to pay that tax, which is many times larger than the war tonnage tax proposed by congress. Such are the facts. Yet in face of them we are informed that the foreign shipping influence is being used at Washington to eliminate the tonnage tax feature of our war revenue bill. But we shall be extremely surprised if congress gives way, especially at this juncture, to any pressure that may be brought to bear upon the representatives of the American people by the representatives of foreign ship-owning interests.

"When the Elkins bill was before the United States senate in 1897, Hon. Stephen B. Elkins said on April 5 of that year: 'The foreign shipping interest opposing this bill can afford to buy every steamship line belonging to the United States engaged in our foreign carrying trade rather than see this bill become a law.' This is even more true today. The foreign trade and passenger business of the United States is worth some $300,000,000 annually to foreign shipping interests, which secure by far the lion's share of American freight and passenger earnings."

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, April 30, 1898:

	Wheat, bushels.	Corn, bushels.
Chicago	3,327,000	11,431,000
Duluth	3,064,000	2,533,000
Milwaukee	58,000	.....
Detroit	34,000	196,000
Toledo	426,000	471,000
Buffalo	1,025,000	815,000
	7,934,000	15,446,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 2,045,000 bushels of wheat and 6,074,000 bushels of corn.

Device for Propeller Repairs.

Editor Marine Review:—I note by the Review of April 28 that Mr. John Haug of Philadelphia takes credit for the design of the propeller dam used on the four twin-screw steamships of the American line. While I have no doubt Mr. Haug may have assisted in the perfecting of this invention, yet I am sure that Mr. Geo. Clarke, at that time assistant superintendent engineer of the combined American and International fleets, was the man who should have the chief amount of credit. I was in Mr. Clarke's office, under him, for six or seven years, and remember well the pride we all felt in Mr. Clarke's invention. I am not positive, but believe that the patent was issued in Mr. Clarke's name. Mr. Clarke is now superintendent engineer of the Newport News ship building works, and will possibly communicate with you himself on the subject.

W. D. KEARFOTT.

Cleveland, April 29, 1898.

Practical Patriotism.

Patriotism of the highest and most practical kind is shown by an order issued recently by the Manhattan Rubber Mfg. Co., New York. The order says that the country needs the services of her sons, and proposes that the company's workmen who go to war shall have their places upon their return, and in their absence the families dependent upon them shall receive half pay. Families of salaried men in the New York office and branch stores who go to war will receive full pay during the absence of such employees. Alex. Henderson, treasurer of the company and a retired naval officer, re-enlisted, and is now serving as chief engineer of the mosquito fleet stationed at New York city. The secretary, E. M. Henderson, and Alex. Henderson, Jr., another employee, have enlisted and have been assigned to vessels in command of the naval reserve. This kind of service is more valuable than subscriptions of money, large or small, and it is doubtful if any business house in the United States will be found with a record more liberal than that already credited to this concern.

An advance of two cents a pound has been made within the past few weeks in Manila rope. The price of Manila hemp has, of course, advanced on account of the war, and there were other conditions attending the supply of hemp in this country that strengthened the market even before hostilities began.

Neafie & Levy of Philadelphia will build for the Moran Towing Co. a large tug to take the place of the Alfred W. Booth, just sold to the government.

Trade Notes.

Arthur D. Story of Essex, Mass., will build for Buzzard's bay patrol service a small steam vessel at a cost of $41,700.

D. H. Bacon, president of the Minnesota Iron Co., has returned from Europe. He has been away for several months on a pleasure trip.

William McAdoo, formerly assistant secretary of the navy, and W. G. McAdoo have formed a partnership for the practice of the law under the firm name of McAdoo & McAdoo, with offices at No. 15 Wall street, New York.

Davis & Son, Kingston, Ont., are building two yachts and a small passenger and freight steamer, the latter for Homer & Co., Gravenhurst, Ont. They are also rebuilding the Muskoka Navigation Co.'s steamer Kanonha and adding 13 feet to a yacht owned by C. Mickle of Gravenhurst.

Major F. A. Mahan, United States engineer corps, Montgomery, Ala., will open bids May 21 for a wooden hull seagoing hydraulic dredge. The Mississippi River Commission, 2732 Pine street, St. Louis, Mo., will open bids May 27 for furnishing five large steel-hulled steam tenders, complete with machinery, cabins, etc.

The Pilots' Association of Philadelphia has contracted with the Neafie & Levy Ship & Engine Building Co. of Philadelphia for a steam pilot boat to replace the Philadelphia, just sold to the government. The new vessel will be 150 by 26 by 14½ feet, of 15 knots speed and to cost about $75,000.

The chief engineer of the Homeopathic hospital, Boston, one of the largest in the country, says that Rubberbestos sheet packing is the best for general use and the only kind that will stay in steam traps any length of time. The combination of rubber and asbestos as manufactured by Chesterton & Co., Boston, Mass., is giving general satisfaction, and practical men wonder why it was not in use long ago.

After testing the Standard automatic releasing hook on several cruisers and gunboats, the bureau of construction and repair, navy department, has ordered that a supply of these hooks be purchased and kept at the several navy yards to equip the boats of new war vessels, as well as those of vessels repairing at the several yards. This order, indicating that hereafter the hook will be a part of the equipment of the navy, is especially gratifying to the manufacturers, the Standard Automatic Releasing Hook Co., No. 22 State street, New York, as approval of the department was secured wholly on the merits of the device. The same was the case with orders from the light-house service and revenue marine bureau of the government, as well as those from managers of lake steamship lines who are anxious to make every possible provision against loss of life on their vessels.

Cleveland vessel owners who are acquainted with Geo. E. Tener of Pittsburg and John A. Donaldson of Cleveland have noted the development of a very large business in Pittsburg steam coal on the lakes under their direction during the past few years. The extent of interests which they represent was not fully realized, however, until a circular was received from them, a few days ago, under the name of Youghiogheny & Lehigh Coal Co., Stock Exchange building, Chicago, directing attention to steamboat fuel docks which they have acquired in Chicago. Fueling docks of the several companies with which they are now associated are as follows: Fairport—Pittsburg, Fairport & Northwestern Dock Co. Geo. E. Tener, manager; Cleveland—Pittsburg & Chicago Gas Coal Co., John A. Donaldson, manager; West Superior—Youghiogheny & Lehigh Coal Co., A. W. Horton, manager; Chicago—Youghiogheny & Lehigh Coal Co., John T. Connery, manager, and A. J. Hitchcock, dock superintendent. There are two docks at Chicago, one in the Michigan slip basin, just inside the harbor entrance, and the other at North Halsted street bridge. In addition to the large coal shipping business of the Pittsburg, Fairport & Northwestern Dock Co. at Fairport, where a car dump machine and other facilities are provided, the Cleveland office of this concern has recently taken over the lake business of the Ohio & Pennsylvania Coal Co. and will hereafter operate the dock on the main river just below Main street bridge that was formerly controlled by that company. The Main street bridge dock, together with the Valley Terminal plant farther up the river, where there is a car dump of capacity even greater than that of the Fairport machine, will give this combination of coal interests exceptional facilities for the shipment of coal during the present season.

A day at Columbus, Ohio.—Special low excursion rates to Columbus, via the Nickel Plate road, Sunday, May 8. See the soldiers in camp. Leave Cleveland at 5:06 a. m. Returning, leave Columbus at 6 p. m. 43

W. E. FITZGERALD, President.
F. C. STARK, Vice President.
A. M. JOYS, Sec'y and Treas.

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South Yard Dry Dock, 450 ft. on Keel Blocks.
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RUDDER PIT TO UNSHIP RUDDERS IN EACH DOCK.
STEEL AND WOOD REPAIRS A SPECIALTY.
ELECTRIC LIGHTS ON EACH DOCK.

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ALSO QUOTATIONS from Market men and Grocers on the Lakes for Provisions and Meat, best quality only.

CATALOGUES without quotations are not wanted.

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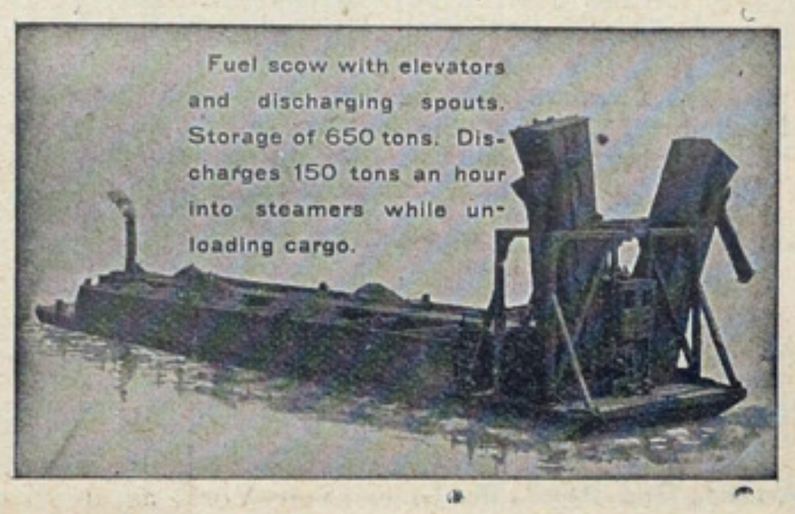
Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

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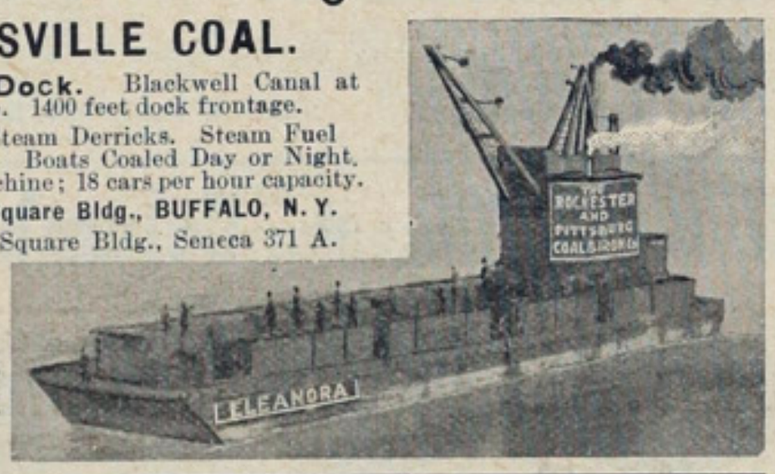
Capt. WM. H. HAZEN,
Dock Superintendent.



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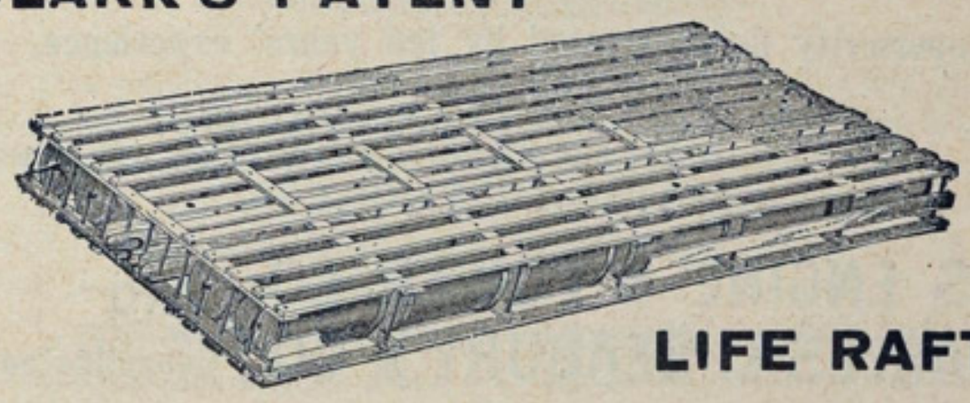

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NOTICE TO SHIP OWNERS AND SHIP BUILDERS.—Information furnished as to the strength of iron or steel vessels under different conditions, and the size and distribution of scantlings required in new vessels for different services, by a naval architect, who is an expert in this work. Address Box 452, Marine Review, Cleveland.

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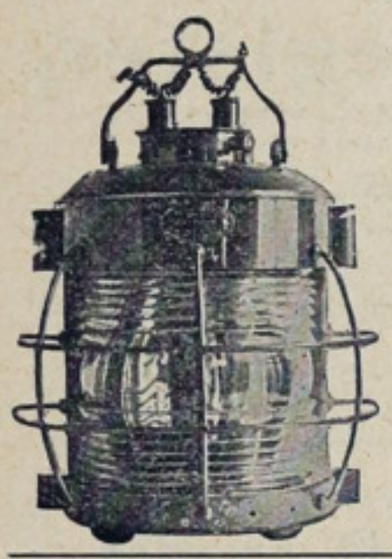

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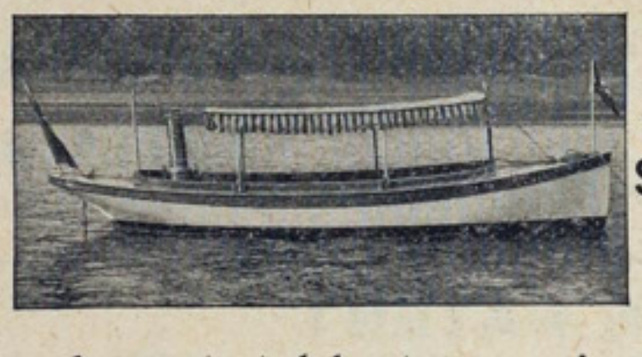

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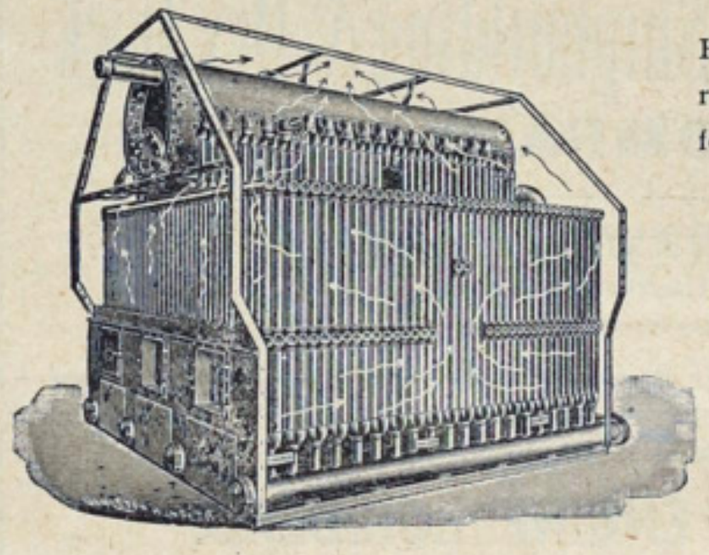

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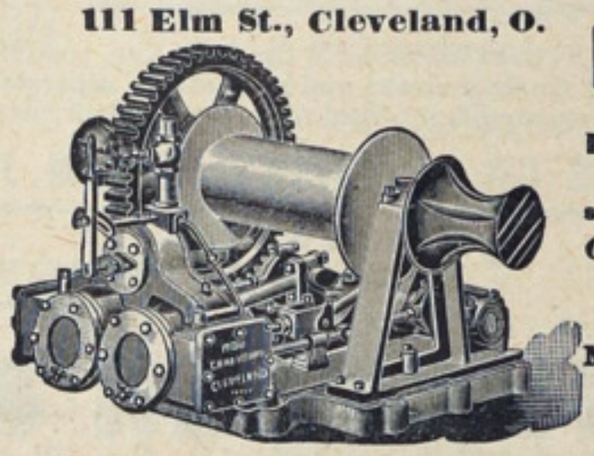

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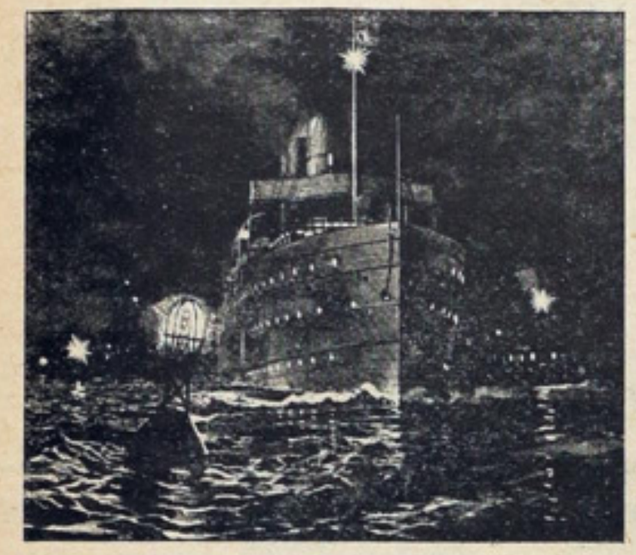

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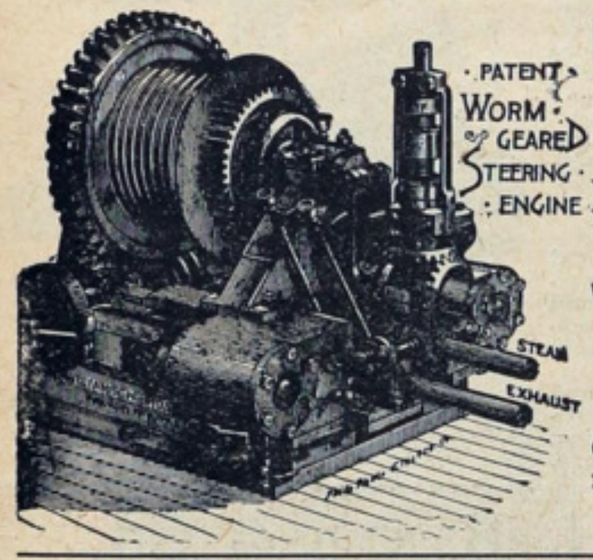

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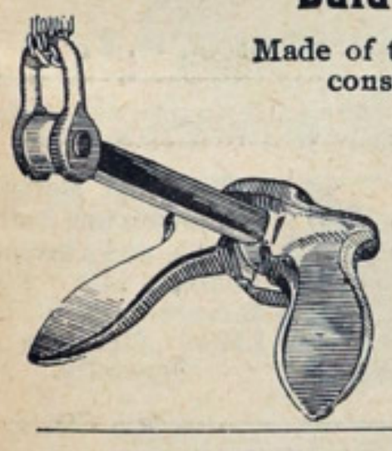

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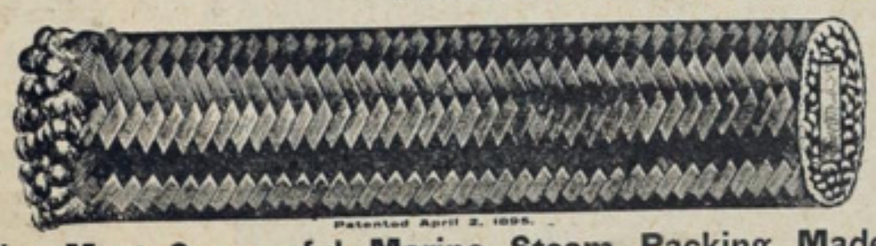

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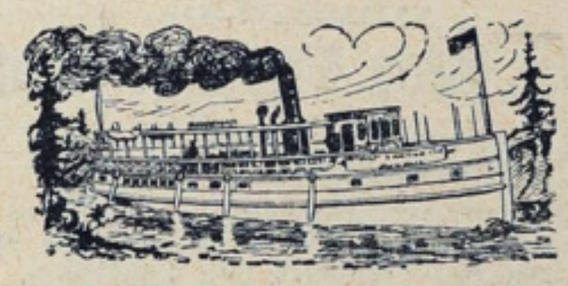

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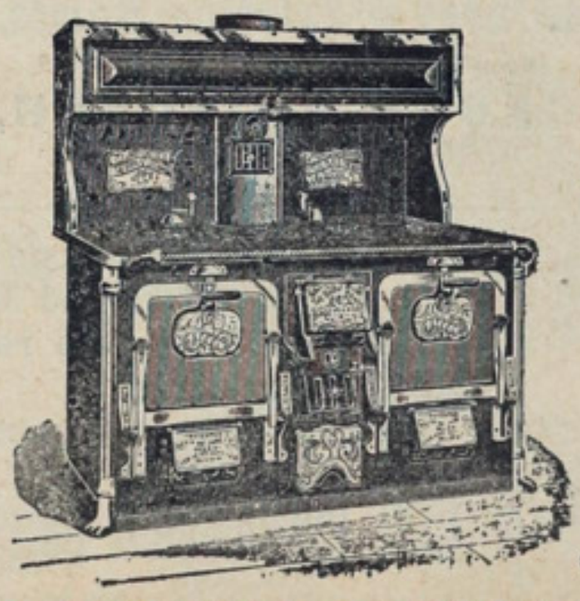

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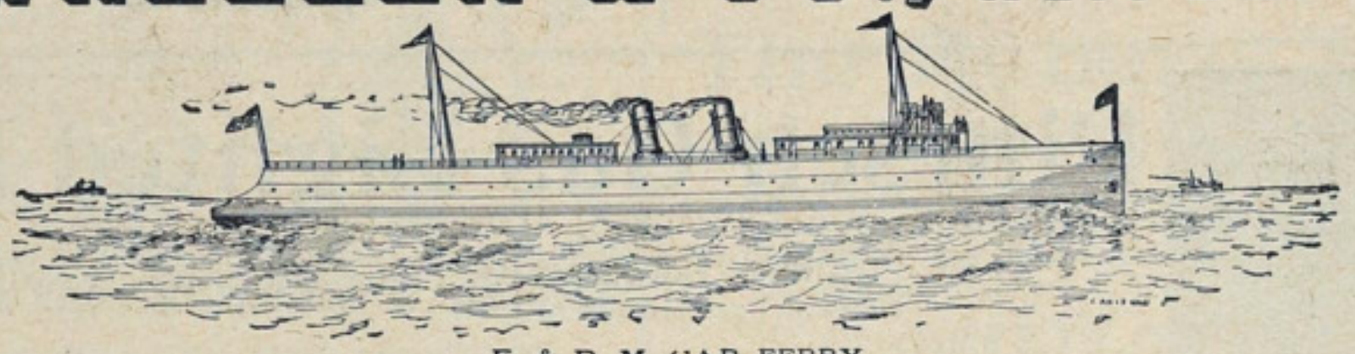

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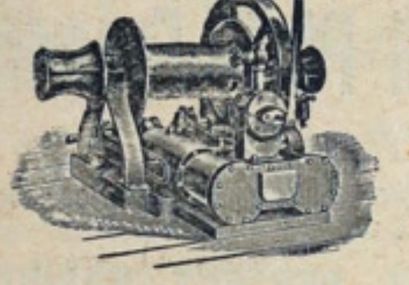

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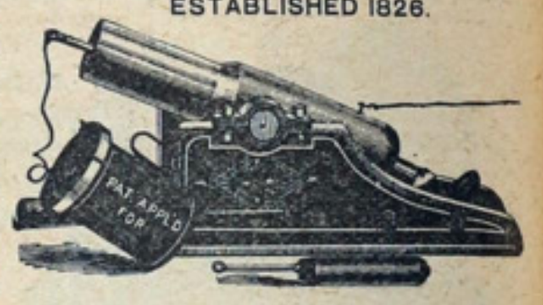

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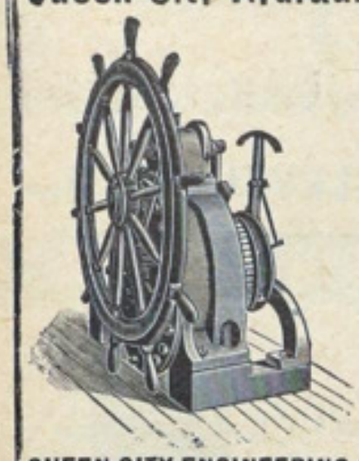

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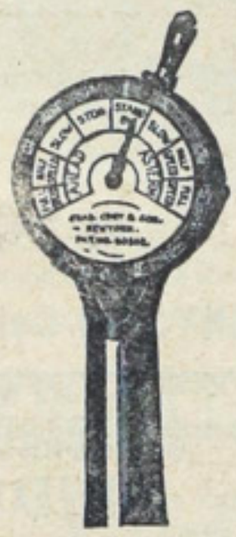

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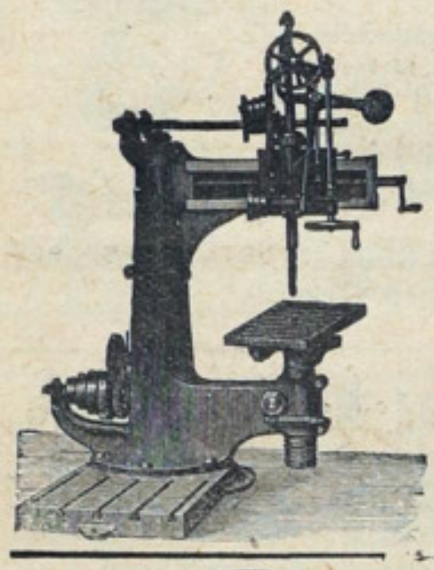

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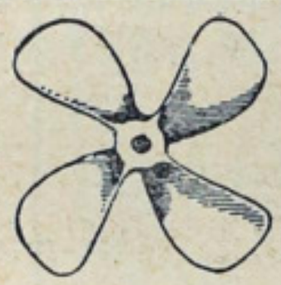

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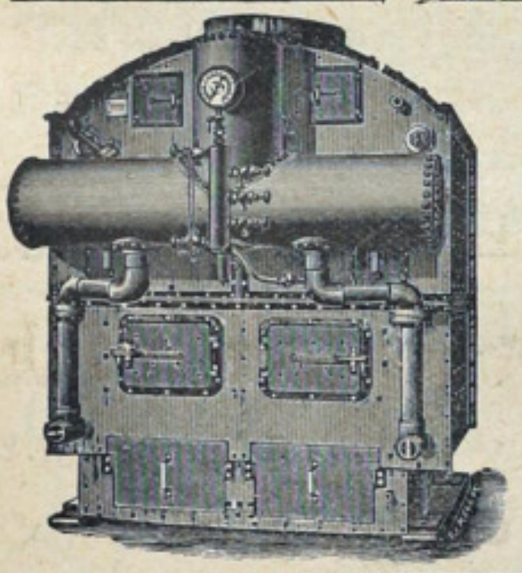

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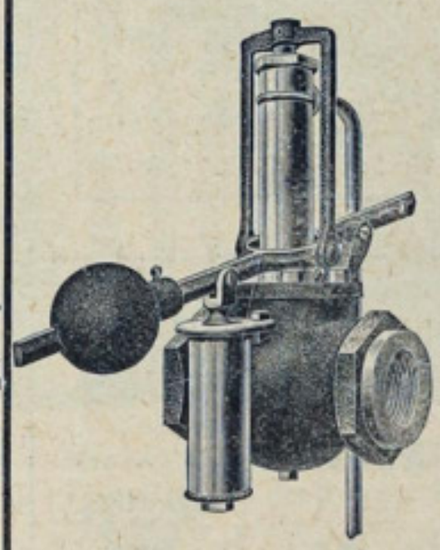

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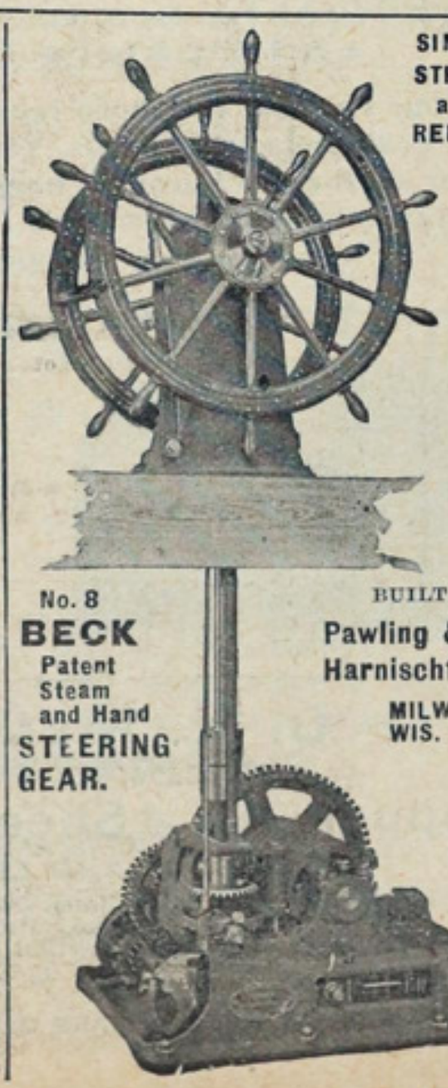

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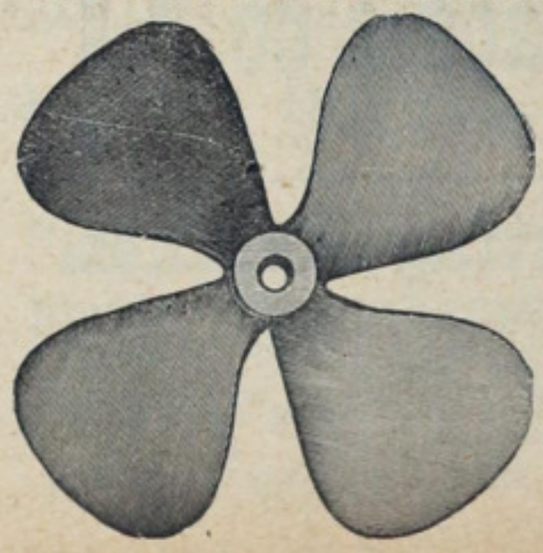

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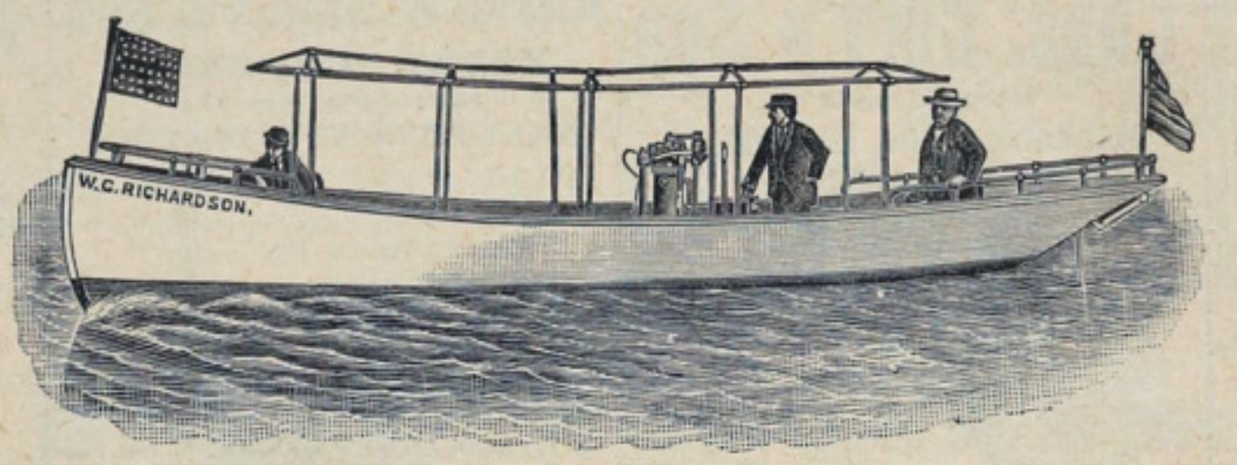

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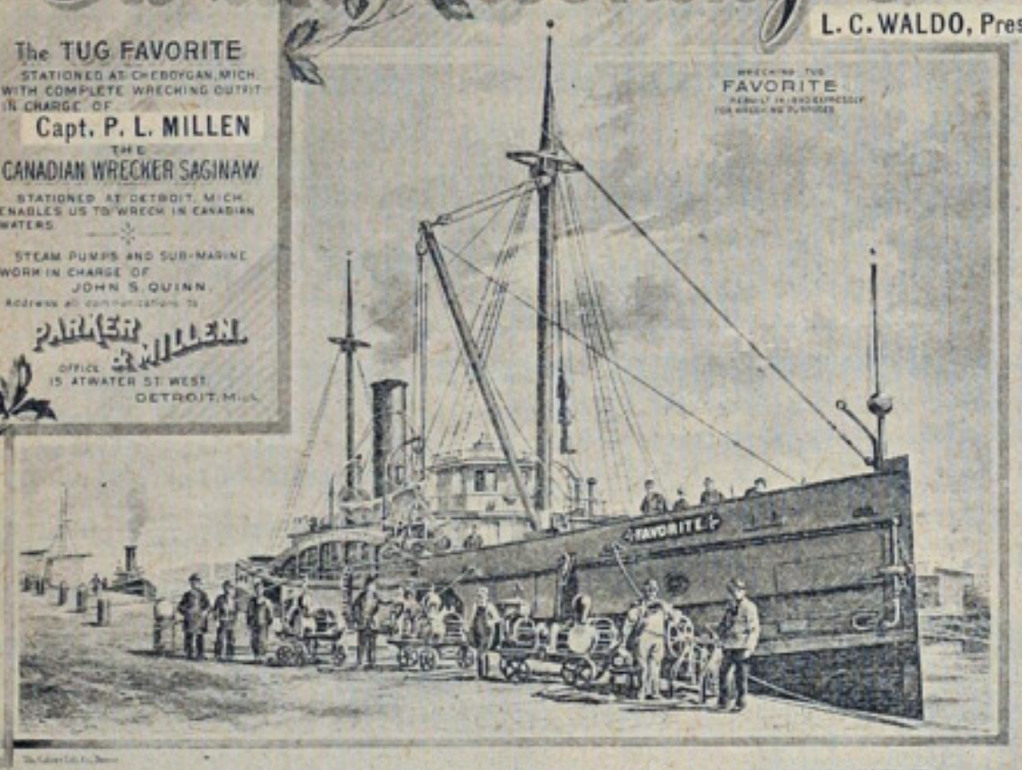

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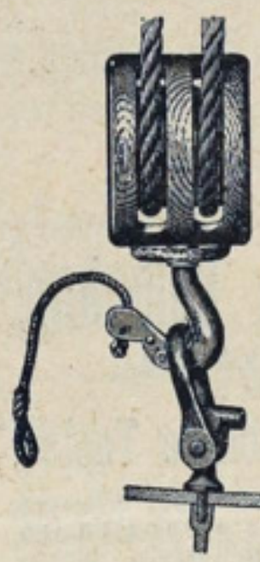

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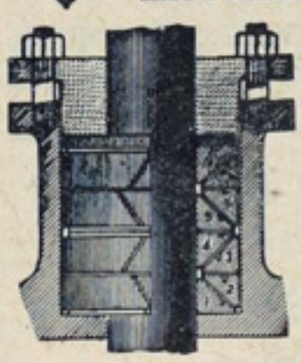

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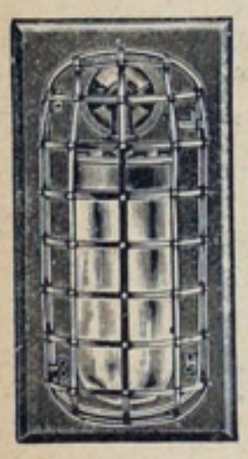

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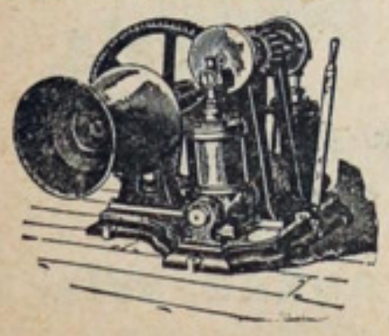

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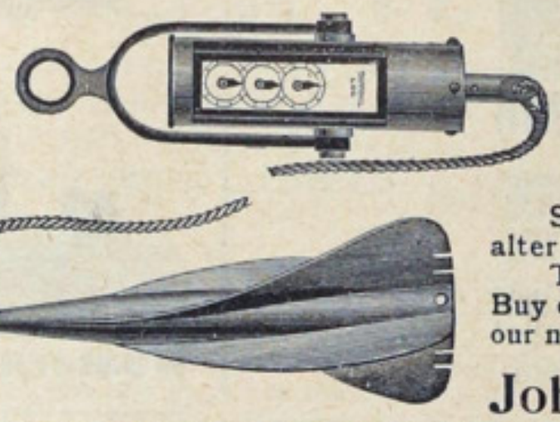

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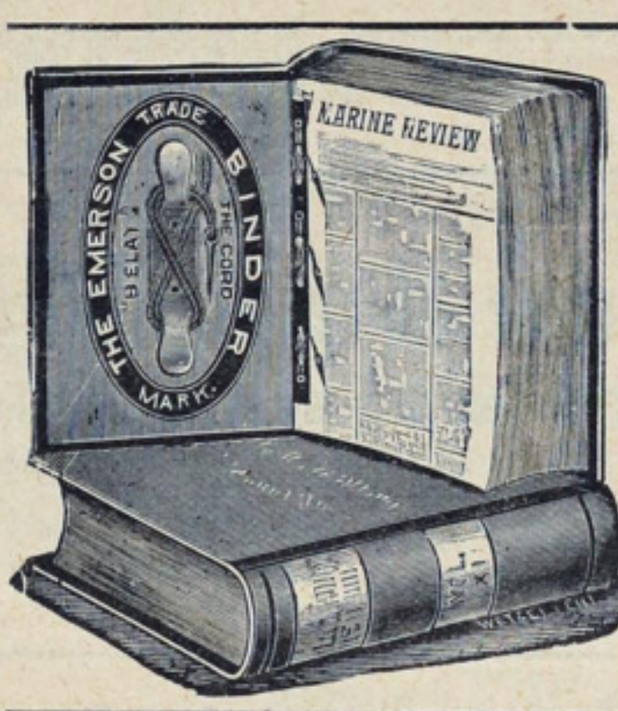

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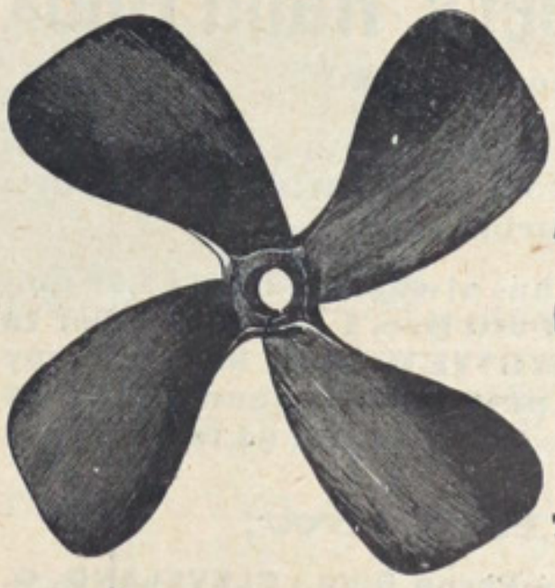

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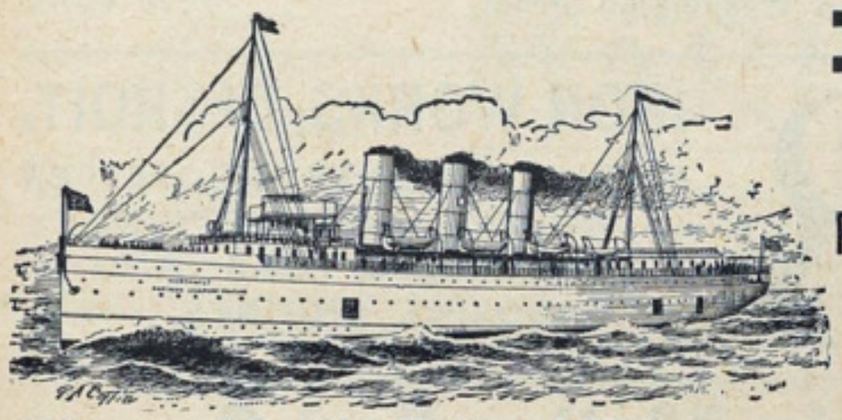

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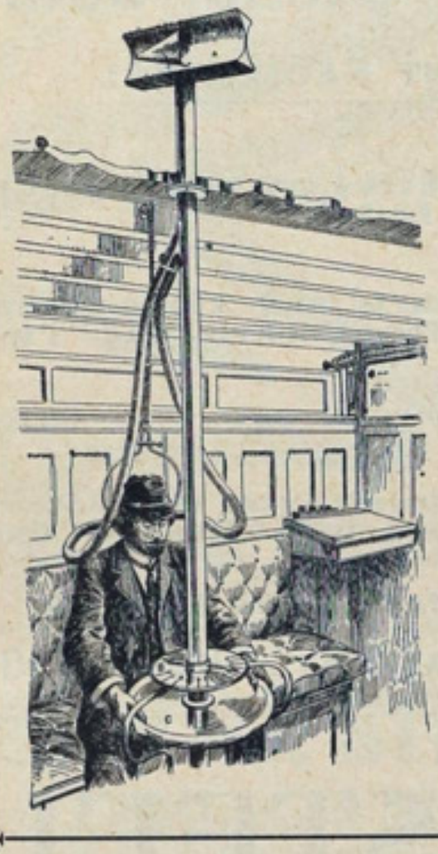

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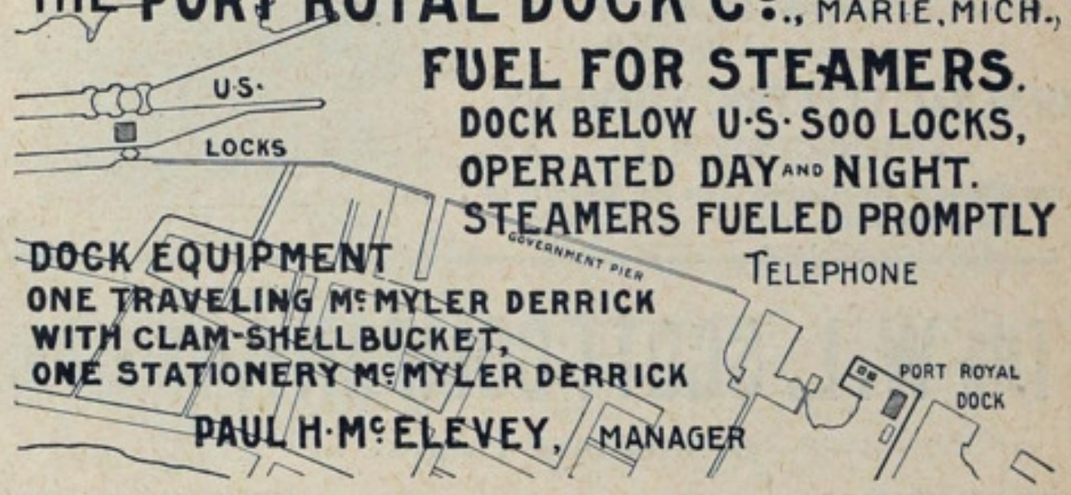

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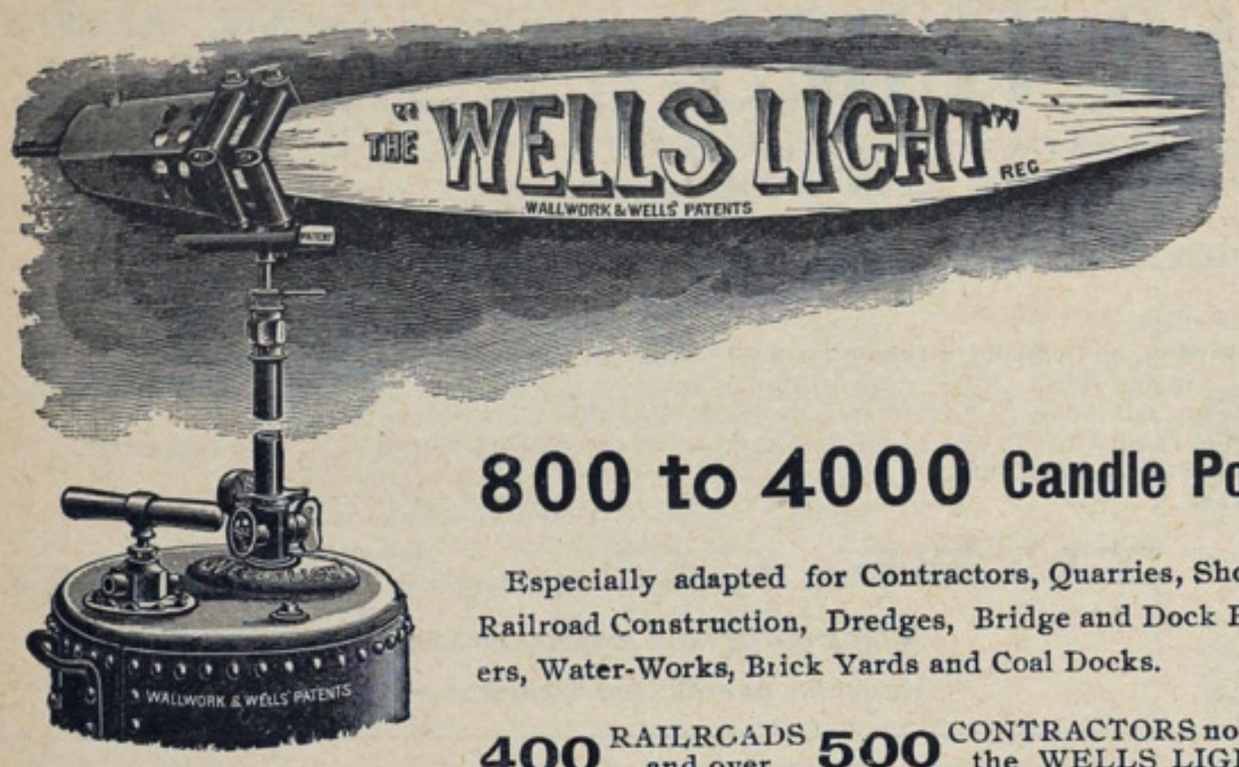

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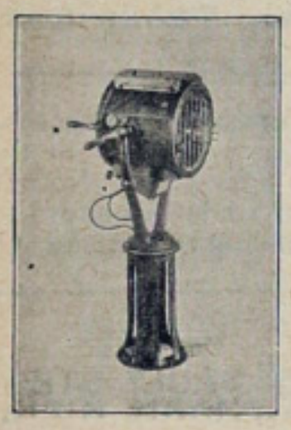

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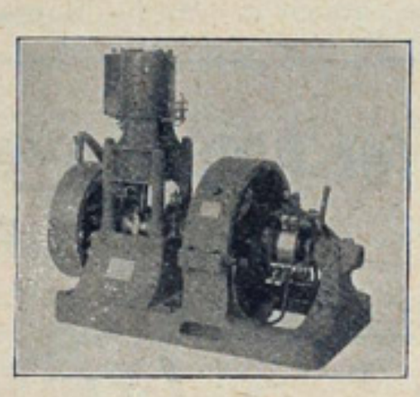

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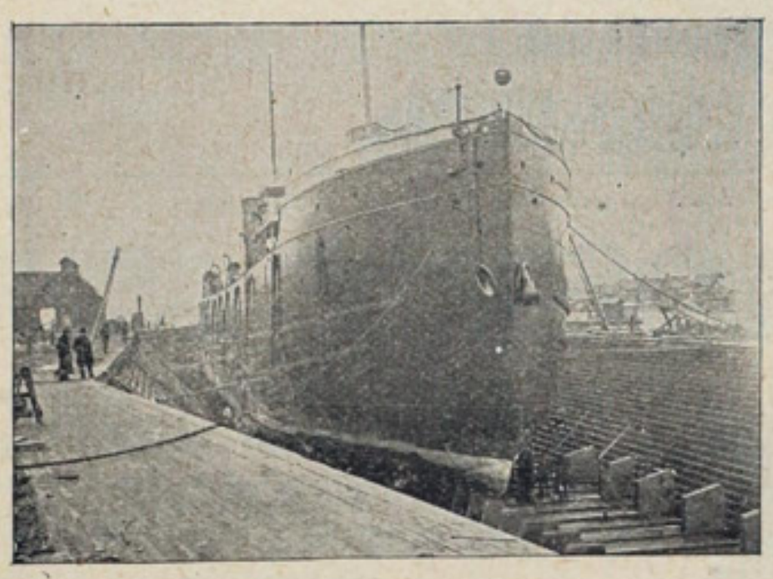

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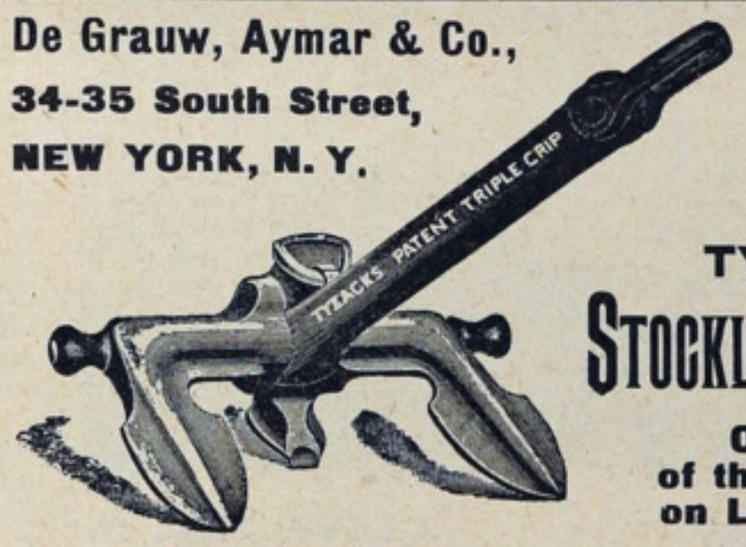

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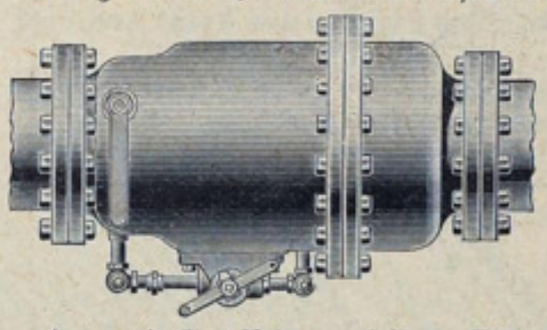

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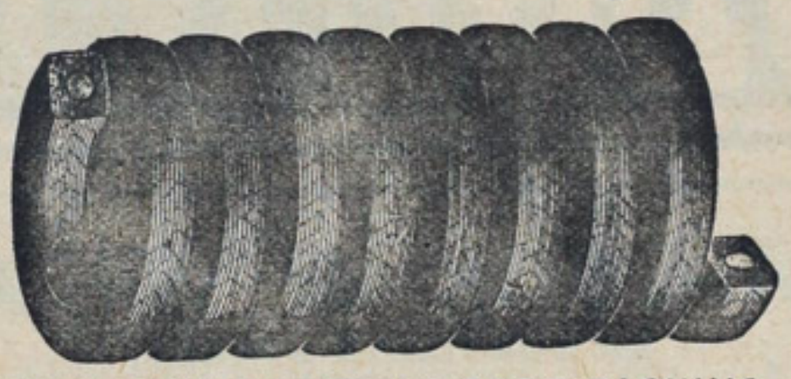

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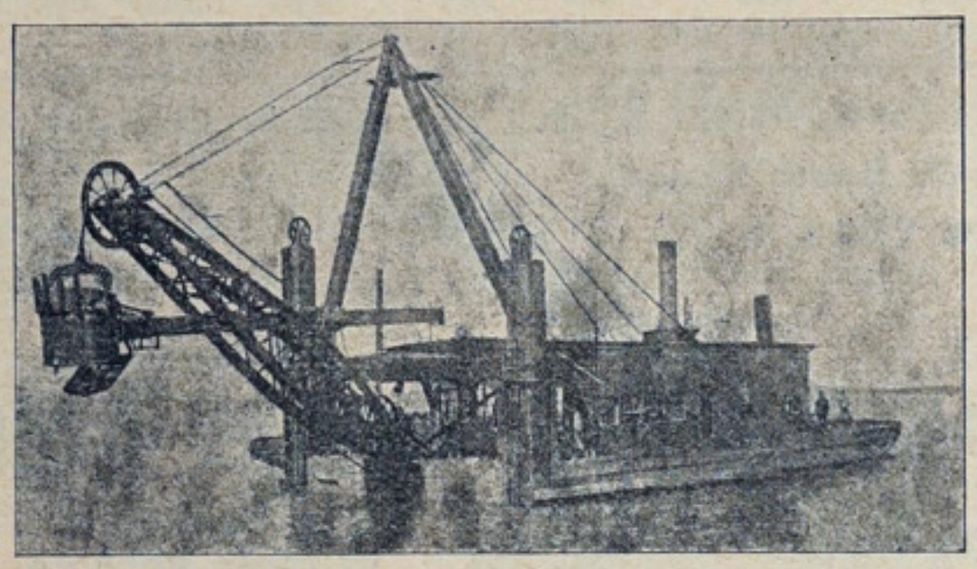

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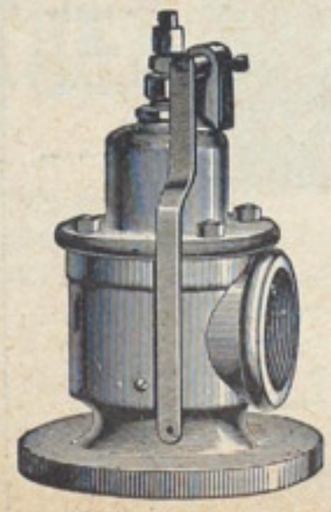

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